Regional Operations Plan

Eastern RTMC Region | Districts 4-0, 5-0, and 8-0

September 14, 2020

pennsylvania
DEPARTMENT OF TRANSPORTATION

TSMO

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Executive Summary

This Regional Operations Plan (ROP) has been developed to cover the Pennsylvania Department of Transportation (PennDOT) Eastern Region. This region is comprised of PennDOT Engineering Districts 4, 5, and 8. This region is centered around the Regional Traffic Management Center (RTMC) located in Harrisburg, PA at the Pennsylvania Emergency Management Agency (PEMA) building.

The previous ROP process for this region was divided into separate documents for each of the three PennDOT Districts. These documents were completed in 2007.

This ROP has been compiled based on guidance from the *TSMO Guidebook, Part I: Planning*, a PennDOT document developed in 2018 which describes how to implement the statewide approach to Transportation Systems Management and Operations (TSMO). TSMO is a set of integrated strategies used to increase the reliability and mobility of existing roadway infrastructure without adding capacity. This is accomplished primarily in 3 ways: Incorporating state of the art intelligent systems, improving management of incidents and events, and encouraging modal shift.

The ROP will complement the statewide TSMO Program Plan by identifying the regional approach to traffic operations and sets the stage for regional implementation of TSMO strategies.

This document will help to enable the Eastern Region of Pennsylvania to:

- Meet federal requirements related to Intelligent Transportation System (ITS) planning (23 CFR 940)
- Incorporate statewide TSMO goals for operations planning at the regional level
- Utilize objectives-driven, performance-based planning processes for operations and congestion management planning
- Integrate/mainstream ITS and operations planning into the overall transportation planning process, per Federal Highway Administration (FHWA) guidance
- Identify and prioritize TSMO capital projects as part of the Transportation Improvement Program (TIP)
- Manage funds for the TSMO operations and maintenance (O&M) in future years

It is anticipated that this ROP will be updated every 4 years. Similar to the Long Range Transportation Plan (LRTP), the ROP should, at a minimum, identify which projects could be undertaken within the first four years, aligning these projects for potential inclusion in the Transportation Improvement Program (TIP).

The planning process was led by a Steering Committee which included PennDOT Bureau of Maintenance and Operations (BOMO), PennDOT Districts 4-0, 5-0, and 8-0. This Steering Committee communicated throughout the process and helped review and refine the message and material to be presented to stakeholders. The Stakeholder Groups included PennDOT District Safety Engineers, PennDOT County Maintenance Departments, the Pennsylvania Turnpike Commission (PTC), county planning departments, transit agencies, and bicycle advocates. Stakeholder Groups met three times for each District – a total of nine stakeholder meetings. These meetings were used to present information on the ROP process and to receive valuable input from the assembled stakeholders on each phase of the plan's development.

A summary of the Long Range Transportation Plan (LRTP) for reach of the planning partners is provided in this document, as well as a discussion of the regional demographics and key transportation elements.

Significant transportation corridors are identified, including the region's interstates, as well as most US routes, and a few of the most important Pennsylvania state routes.

A summary of existing conditions is provided within this document, including the current ITS elements, existing congestion and safety issues, and notable recently completed projects. Looking towards the future, a discussion of planned infrastructure and land use changes is included, as well as a list of major roadway projects under consideration.

The PennDOT One Map website (gis.penndot.gov/OneMap) was heavily utilized in the development of this plan. The availability of extensive data on the region's operations was tremendously helpful in pinpointing existing congestion and safety issues, as well as identifying gaps in current ITS device coverage. These various hotspots were presented to the Steering Committee and Stakeholder Groups throughout the ROP process and refined based on input received at meetings.

Through data analysis and stakeholder input, a list of the region's transportation needs and operation issues was developed. These needs and issues were organized into seven priority areas (project abbreviations are in parentheses):

- Freeway and Arterial Operations (FA)
- Traffic Incident Management (TIM)
- Traveler Information (TI)
- Communications Network (CN)
- Multimodal Connectivity (MC)
- Operational Teamwork/Institutional Coordination

Projects were then developed for identified hotspots based on these issues and needs. Of particular focus in this ROP are Integrated Corridor Management (ICM) projects which seek to improve incident management and maximize use of available capacity on important parallel corridors. There are also a number of signal improvement projects and other ITS-related projects. A number of multimodal projects have also been identified, including improvements to transit operations and bicycle infrastructure that are anticipated to improve overall operations through encouraging mode change and an equitable transportation system for all users.

Projects were prioritized based on stakeholder input and discussion into "High Priority" and "Normal Priority" groups. The ROP Projects were then divided into short-term and long-term categories. Short-term projects were identified as those which could be implemented in less than four years. Long-term projects are those that would take four or more years. The following tables show the complete list of recommended projects for the SPC Region.

HIGH PRIORITY PROJECTS

Project #	Project	Priority Area	Stakeholders*	Planned Improvements
CN.01	Dauphin I-283/PA-283 ITS Fiber Interconnect	Communications Network	PennDOT District 8-0	Fiber Deployment
FA.01	Tilghman St. Signal Improvements	Freeway and Arterial Operations	PennDOT District 5-0	Traffic Signal Improvements

Project #	Project	Priority Area	Stakeholders*	Planned Improvements
FA.02	Cressona Signal Improvements	Freeway and Arterial Operations	PennDOT District 5-0	Traffic Signal Improvements
FA.03	Tamaqua Signal Improvements	Freeway and Arterial Operations	PennDOT District 5-0	Traffic Signal Improvements
FA.04	US 22/I-78 ICM	Freeway and Arterial Operations	PennDOT District 5-0	ICM, CCTV, DMS, Travel Times, Traffic Signal Improvements, Variable Speed Limits, Queue Detection, Flex Lanes, Fiber Deployment
FA.05	I-81 ICM (D8)	Freeway and Arterial Operations	PennDOT District 8-0	ICM, CCTV, DMS, Traffic Signal Improvements, Queue Detection, Transit/Pedestrian Improvements
FA.06	Cameron St. Signal Improvements	Freeway and Arterial Operations	PennDOT District 8-0	Traffic Signal Improvements
MC.01	LVPC Walk/Roll Bicycle Commuting Corridors	Multimodal Connectivity	**LVPC**, PennDOT District 5-0	On-Street Bike Infrastructure
MC.02	LANTA Enhanced Bus Service	Multimodal Connectivity	**LANTA**, PennDOT District 5-0, LVPC	Transit Improvements, Park & Ride
TI.01	District 4-0 ITS Gaps	Traveler Information	PennDOT District 4-0	DMS
TI.02	I-84 Corridor ITS	Traveler Information	PennDOT District 4-0	CCTV, DMS, RWIS
TI.03	Susquehanna County ITS Gaps	Traveler Information	PennDOT District 4-0	CCTV, DMS
TI.04	D8 Interstate CCTV Gaps	Traveler Information	PennDOT District 8-0	CCTV
TI.05	D8 Interstate DMS Gaps	Traveler Information	PennDOT District 8-0	DMS
TI.06	D8 Interstate CCTV DMS Gaps	Traveler Information	PennDOT District 8-0	CCTV
TI.07	US 222 Corridor ITS	Traveler Information	PennDOT District 5-0	CCTV, DMS
TI.08	District 5-0 CCTV Gaps	Traveler Information	PennDOT District 5-0	CCTV
TI.09	District 5-0 DMS Gaps	Traveler Information	PennDOT District 5-0	DMS
TI.10	District 5-0 Replace Existing Portable CMS	Traveler Information	PennDOT District 5-0	DMS
TIM.01	District 5-0 Curve Warning	Traffic Incident Management	PennDOT District 5-0	Dynamic Curve Warning
TIM.02	Berks Freeway Service Patrols	Traffic Incident Management	PennDOT District 5-0	Freeway Service Patrol
TIM.03	I-81 Freeway Service Patrol	Traffic Incident Management	**PennDOT District 8-0**, Harrisburg MPO	Freeway Service Patrol

Project #	Project	Priority Area	Stakeholders*	Planned Improvements
TIM.04	South Central Freeway Service Patrols	Traffic Incident Management	**PennDOT District 8-0**, York MPO, Lancaster MPO	Freeway Service Patrol
TIM.05	I-81 Safety Systems	Traffic Incident Management	PennDOT District 4-0	Dynamic Curve Warning, Bridge De-Icing
TIM.06	US 222/US 422 Curve Warning	Traffic Incident Management	PennDOT District 5-0	Dynamic Curve Warning

* If multiple stakeholders, primary stakeholder in **bold**

Other Recommended Projects

Project #	Project	Priority Area	Stakeholders*	Planned Improvements
CN.02	US 30 Fiber Deployment	Communications Network	PennDOT District 8-0	Fiber Deployment
FA.07	PA-924 Ramp Preemption	Freeway and Arterial Operations	PennDOT District 4-0	Traffic Signal Improvements
FA.08	Marysville Signal Improvements	Freeway and Arterial Operations	PennDOT District 8-0	Traffic Signal Improvements
FA.09	US 22/322 Ramp Metering	Freeway and Arterial Operations	PennDOT District 8-0	Ramp Meter
FA.10	Jim Thorpe Operations Improvements	Freeway and Arterial Operations	PennDOT District 5-0	TBD
FA.11	Church St. Signal Improvements	Freeway and Arterial Operations	PennDOT District 4-0	Traffic Signal Improvements
FA.12	Davis St. Signal Improvements	Freeway and Arterial Operations	PennDOT District 4-0	Traffic Signal Improvements
FA.13	Wilkes-Barre Signal Improvements	Freeway and Arterial Operations	PennDOT District 4-0	Traffic Signal Improvements
FA.14	Milford Operations Improvements	Freeway and Arterial Operations	PennDOT District 4-0	Traffic Signal Improvements, CCTV, DMS
FA.15	Downtown Easton Signal Improvements	Freeway and Arterial Operations	**PennDOT District 5-0**, LANTA	Traffic Signal Improvements
FA.16	Emmaus Ave. Signal Improvements	Freeway and Arterial Operations	PennDOT District 5-0	Traffic Signal Improvements
FA.17	Hill to Hill Bridge Signal Improvements	Freeway and Arterial Operations	PennDOT District 5-0	Traffic Signal Improvements
FA.18	PA-100 Signal Improvements	Freeway and Arterial Operations	PennDOT District 5-0	Traffic Signal Improvements
FA.19	PA-329 Signal Improvements	Freeway and Arterial Operations	PennDOT District 5-0	Traffic Signal Improvements
FA.20	US 222 Signal Improvements	Freeway and Arterial Operations	PennDOT District 5-0	Traffic Signal Improvements
FA.21	Palmerton Signal Improvements	Freeway and Arterial Operations	PennDOT District 5-0	Traffic Signal Improvements
FA.22	Boyertown Signal Improvements	Freeway and Arterial Operations	PennDOT District 5-0	Traffic Signal Improvements
FA.23	Waynesboro Signal Improvements	Freeway and Arterial Operations	PennDOT District 8-0	Traffic Signal Improvements

Project #	Project	Priority Area	Stakeholders*	Planned Improvements
FA.24	Carlisle Signal Improvements	Freeway and Arterial Operations	PennDOT District 8-0	Traffic Signal Improvements
FA.25	Governor Rd Signal Improvements	Freeway and Arterial Operations	PennDOT District 8-0	Traffic Signal Improvements
FA.26	I-83 Queue Warning	Freeway and Arterial Operations	PennDOT District 8-0	Queue Detection, DMS
FA.27	Lancaster Signal Improvements	Freeway and Arterial Operations	PennDOT District 8-0	Traffic Signal Improvements
FA.28	PA-741 Signal Improvements	Freeway and Arterial Operations	PennDOT District 8-0	Traffic Signal Improvements
FA.29	Lititz Pk/Oregon Pk Signal Improvements	Freeway and Arterial Operations	PennDOT District 8-0	Traffic Signal Improvements
FA.30	US 30 Queue Warning	Freeway and Arterial Operations	PennDOT District 8-0	Queue Detection, DMS
FA.31	Lebanon Signal Improvements	Freeway and Arterial Operations	PennDOT District 8-0	Traffic Signal Improvements
FA.32	US 30 York Signal Improvements	Freeway and Arterial Operations	PennDOT District 8-0	Traffic Signal Improvements
FA.33	Gettysburg Signal Improvements	Freeway and Arterial Operations	PennDOT District 8-0	Traffic Signal Improvements
FA.34	I-81 (Wilkes-Barre/Scranton) ICM	Freeway and Arterial Operations	**PennDOT District 4-0**, Lackawanna/Luzerne MPO, COLTS, Luzerne Transit	ICM, Queue Detection, Ramp Meters, Flex Lanes, Traffic Signal Improvements, Transit Improvements
FA.35	I-80 (Monroe) ITS	Freeway and Arterial Operations	**PennDOT District 5-0**, NEPA MPO, Martz, Monroe County Transit Authority	CCTV, DMS, Junction Control, Ramp Meter, Variable Speed Limits, Transit Improvements, Traffic Signal Improvements
FA.36	Downtown Reading Signal Improvements	Freeway and Arterial Operations	PennDOT District 5-0	Traffic Signal Improvements
FA.37	Wernersville-Wyomissing Signal Improvements	Freeway and Arterial Operations	PennDOT District 5-0	Traffic Signal Improvements
FA.38	US 30 ICM	Freeway and Arterial Operations	PennDOT District 8-0	ICM, Traffic Signal Improvements, DMS
MC.03	Lancaster Active Transportation Short-Term Priority Projects	Multimodal Connectivity	**City of Lancaster**, PennDOT District 8-0	On-Street Bike Infrastructure
MC.04	Lehigh Valley Bike Share	Multimodal Connectivity	**LVPC**, city governments	Bike Share
MC.05	Harrisburg Transit Connections	Multimodal Connectivity	**Harrisburg MPO**, CAT, PennDOT District 8-0	Transit Improvements
MC.06	Harrisburg Transit Priority	Multimodal Connectivity	**Harrisburg MPO**, CAT, PennDOT District 8-0	Transit Improvements
MC.07	LVPC Walk/Roll Catalytic Projects	Multimodal Connectivity	**LVPC**, PennDOT District 5-0	On-Street Bike Infrastructure/Trail Expansion
MC.08	Wescosville Park & Ride Improvements	Multimodal Connectivity	**PennDOT District 5-0**, LVPC	Park & Ride

Project #	Project	Priority Area	Stakeholders*	Planned Improvements
TIM.07	Wilkes-Barre/Scranton Freeway Service Patrols	Traffic Incident Management	**PennDOT District 4-0**, Lackawanna/Luzerne MPO	Freeway Service Patrol
TIM.08	Wilkes-Barre/Scranton TIM Team	Traffic Incident Management	**Lackawanna/Luzerne MPO**, PennDOT District 4-0, Local Municipalities, Emergency Personnel	TIM Team
TIM.09	Lehigh Valley Freeway Service Patrols	Traffic Incident Management	**PennDOT District 5-0**, LVPC	Freeway Service Patrol
TIM.10	Lehigh Valley TIM Team	Traffic Incident Management	**Lehigh Valley EMA**, LVPC, PennDOT District 5-0, Local Municipalities, Emergency Personnel	TIM Team
TIM.11	Reading TIM Team	Traffic Incident Management	**Reading MPO, PennDOT District 5-0**, Local Municipalities, Emergency Personnel	TIM Team
TIM.12	South Central TIM Team	Traffic Incident Management	**PennDOT District 8-0**, Planning Partners, Local Municipalities, Emergency Personnel	TIM Team
TIM.13	District 8-0 Curve Warning	Traffic Incident Management	PennDOT District 8-0	Dynamic Curve Warning, CCTV
TIM.14	I-81 Emergency Access	Traffic Incident Management	PennDOT District 4-0	Crossovers, Emergency Access Points
TIM.15	District 8-0 Bridge De-icing	Traffic Incident Management	PennDOT District 8-0	Bridge De-icing
TIM.16	US 15 Corridor Incident Management	Traffic Incident Management	**PennDOT District 8-0**, Adams MPO, Local Municipalities, Emergency Personnel	TIM Team, Parallel Route Improvements, Crossovers, Coordination
TI.11	D5 TMC Upgrades	Traveler Information	PennDOT District 5-0	TMC Upgrades
TI.12	Lebanon County RWIS	Traveler Information	PennDOT District 8-0	RWIS
TI.13	I-81/Northeast Extension Travel Times	Traveler Information	**PennDOT District 4-0**, Pennsylvania Turnpike	DMS, Travel Times
TI.14	US 11/15 Devices	Traveler Information	PennDOT District 8-0	CCTV, DMS
TI.15	US 22/322 Devices	Traveler Information	PennDOT District 8-0	CCTV, DMS
TI.16	US 30 ITS	Traveler Information	PennDOT District 8-0	CCTV, DMS, Traffic Signal Improvements
TI.17	District 8-0 DMS Interstate Approach Gaps	Traveler Information	PennDOT District 8-0	DMS
TI.18	Dillsburg ITS	Traveler Information	PennDOT District 8-0	CCTV, DMS
TI.19	District 5-0 CCTV Digital Retrofit	Traveler Information	PennDOT District 5-0	CCTV
TI.20	District 5-0 DMS Interstate Approach Gaps	Traveler Information	PennDOT District 5-0	DMS
TI.21	Berks ITS	Traveler Information	PennDOT District 5-0	CCTV, DMS, RWIS

* If multiple stakeholders, primary stakeholder in **bold**

In addition to the projects outlined above, four studies and initiatives were also developed as part of the ROP process. While specific projects could be determined for many of the issues and needs, others need further study to best to determine the correct mitigation to improve operations. Recommended studies can be found in the following table.

Recommended Studies and Initiatives

Study	Priority Area	Stakeholders*	Notes
Lancaster Transit Operations Study	Multimodal Connectivity	**Lancaster MPO**, South Central Transit Authority	Identify corridors for transit priority treatments (bus lanes, queue jumps, Transit Signal Priority, etc.), improve connectivity between Amtrak/Downtown, identify Park & Ride expansion needs/opportunities. Consider Orange/King Sts., Prince St., and Queen/Duke Sts.. For transit priority, per latest Transit Development Plan
Eastern RTMC Truck Parking Study	Multimodal Connectivity	PennDOT Central Office	Determine needs and locations for possible expansion of truck parking. Study possibility of installing Truck Parking Management System. Consider potential public-private partnership opportunities with private truck stop facilities. Coordinate with planned PennDOT Truck Parking Study.
Lebanon Valley Expo Center Event Management	Operational Teamwork/Institutional Coordination	Lebanon Valley Expo Center	Improve traffic management for special events.
Renaissance Faire Event Management	Operational Teamwork/Institutional Coordination	PA Renaissance Faire	Improve traffic management for events.

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Acronyms and Abbreviations

Abbreviation/Acronym	Term
511PA	511 Pennsylvania Traveler Information System
AADT	Average Annual Daily Traffic
ACTPO	Adams County Transportation Planning Organization
ARLE	Automated Red Light Enforcement
ATSPM	Automated Traffic Signal Performance Measures
BARTA	Berks Area Reading Transportation Authority
BOMO	Bureau of Maintenance and Operations
CCCT	Carbon County Community Transit
CCTV	Closed-Circuit Television
CDART	Crash Data Analysis and Retrieval Tool
CMP	Congestion Management Process
COLTS	County of Lackawanna Transit System
CRS	Crash Record System
DMS	Dynamic Message Sign
DVMT	Daily Vehicle Miles Traveled
ERTMC	Eastern Regional Traffic Management Center
FAST	Fixed Anti-Icing Spray Technology
FHWA	Federal Highway Administration
FSP	Freeway Service Patrol
HAR	Highway Advisory Radio
HATS	Harrisburg Area Transportation Study
HD	High-Definition
ITS	Intelligent Transportation System
LANTA	Lehigh and Northampton Transportation Authority
LCTA	Luzerne County Transportation Authority
LRTP	Long Range Transportation Plan
LRWY	Lehigh Railway
LVPC	Lehigh Valley Planning Commission
LVTS	Lehigh Valley Transportation Study
MAP-21	Moving Ahead for Progress in the 21st Century
MCTA	Monroe County Transportation Authority
MPO	Metropolitan Planning Organization
MTP	Metropolitan Transportation Plan
NACTO	National Association of City Transportation Officials
NEPA	Northeastern Pennsylvania Alliance
NHS	National Highway System

NTRPDC	Northern Tier Regional Planning and Development Commission
O&M	Operations and Maintenance
P3	Public-Private Partnership
PEMA	Pennsylvania Emergency Management Agency
PennDOT	Pennsylvania Department of Transportation
PennTIME	Pennsylvania Traffic Incident Management Enhancement
PSP	Pennsylvania State Police
RATS	Reading Area Transportation Study
RITIS	Regional Integrated Transportation Information System
ROP	Regional Operations Plan
RPO	Rural Planning Organization
RTMC	Regional Traffic Management Center
RWIS	Roadway Weather Information System
STS	Schuylkill Transportation System
TIM	Traffic Incident Management
TIP	Transportation Improvement Program
TNC	Transportation Network Companies
TSMO	Transportation Systems Management and Operations
TSP	Transit Signal Priority
YRC	York Railway Company

Chapter 1. Overview of the Region

This ROP has been compiled based on guidance from the *TSMO Guidebook, Part I: Planning*, a PennDOT document developed in 2018 which describes how to implement the statewide approach to Transportation Systems Management and Operations (TSMO). TSMO is a set of integrated strategies used to increase the reliability and mobility of existing roadway infrastructure without adding additional lane miles. The ROP will complement the TSMO Program Plan by identifying the regional approach to traffic operations and sets the stage for regional implementation of TSMO strategies.

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It is anticipated that this ROP will be updated every four or five years. Similar to the Long Range Transportation Plan (LRTP), the ROP should, at a minimum, identify which projects could be undertaken within the first four years, aligning these projects for potential inclusion in the TIP.

Synopsis of the Region

For Transportation Systems Management and Operations (TSMO) planning, Pennsylvania is broken into four regions whose borders coincide with Pennsylvania Department of Transportation's (PennDOT) Regional Traffic Management Center (RTMC) operational areas. These regions can be seen in **Figure 1** (next page). The Eastern Region comprises PennDOT Engineering Districts 4-0, 5-0, and 8-0, and includes 20 counties. The RTMC for the Eastern Region is located within District 8-0, at the PEMA building, in Harrisburg, PA.

The previous ROP process for this region was divided into three separate documents completed for each region that covered each of the 3 Districts that are part of the Eastern Region. These documents were completed by PennDOT as follows:

- Northeastern Region (District 4-0) – July 2007
- District 5-0 Region – October 2007
- South Central (District 8-0) – July 2007

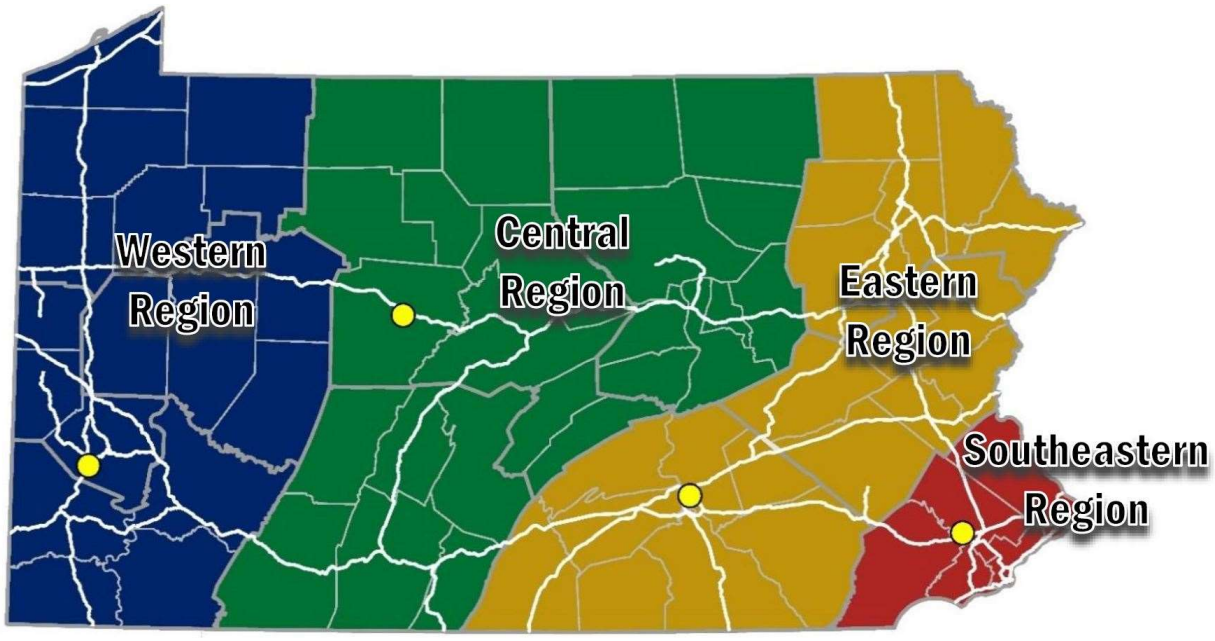


FIGURE 1: TSMO REGIONS WITHIN PENNSYLVANIA

The Eastern portion of Pennsylvania includes 20 counties and a population of 4.1 million people across 12,000 square miles. This region includes PennDOT Engineering Districts 4-0, 5-0 and 8-0. The region includes the following counties: Lackawanna, Luzerne, Pike, Susquehanna, Wayne and Wyoming within PennDOT District 4-0; Berks, Carbon, Lehigh, Monroe, Northampton and Schuylkill within PennDOT District 5-0; and Adams, Cumberland, Dauphin, Franklin, Lancaster, Lebanon, Perry and York within PennDOT District 8-0. The transportation network within the Eastern Pennsylvania Region consists of 37,000 linear miles and over 13,000 bridges. The Regional Traffic Management Center (RTMC) for the Eastern Region is located in the District 8-0 office in Harrisburg, PA.

District 4-0

The topography of District 4-0 is fairly mountainous, with the majority of the population living in the Wyoming Valley, which stretches from Lackawanna County to Luzerne County. This physical trait can facilitate heavy fog (i.e. valley fog) or snowfall and/or icing on roadways which can create especially challenging and treacherous driving conditions.

When events attracting thousands of people occur, the interstates can be congested with traffic from these events. The climate in northeastern Pennsylvania is considered to be moist continental, which includes four seasons, with approximately equal precipitation in the winter and summer seasons, and particularly cold winters. This creates an environment where most road construction is done in the summer months. Occasional tropical storms and hurricanes can create flooding events in the summer and fall seasons. Flooding can also be caused by spring or winter thaws in situations where there has been particularly heavy winter snowfall and/or ice storm. The cities of Scranton and Wilkes-Barre make up the central hub of the region. The Scranton/Wilkes-Barre Metropolitan Area is the main urban concentration in the Northeastern Region. Most of the interstate highways within the Region pass through Scranton/Wilkes-Barre, with the exception of I-80, which traverses the southern border of the District. I-81 runs north-south through the region, connecting Scranton/Wilkes-Barre to Hazleton in the south and New York State to the north. The

Pennsylvania Turnpike's Northeast Extension (I-476) also runs north-south through the region. I-380 provides a spur route connecting Scranton and I-81 south to I-80 in Monroe County. I-380 connects east-west from I-380 towards I-87 in New York State. I-84 runs from the Scranton area northeast through New England to Massachusetts. Major non-interstates include US 6 and US 11.

District 5-0

District 5-0 is located in the eastern part of Pennsylvania and is comprised of six counties: Berks, Carbon, Lehigh, Monroe, Northampton, and Schuylkill. The region consists of two MPOs – The Lehigh Valley Transportation Study (LVTS) – encompasses Lehigh and Northampton counties, while the Reading Area Transportation Study (RATS) consists of Berks County. Northeastern Pennsylvania Alliance (NEPA) covers the remaining area in the District. NEPA is split between PennDOT District 4-0 and District 5-0, with Schuylkill, Carbon, and Monroe counties included in District 5-0. The District 5-0 office is located in downtown Allentown in Lehigh County. District 5-0 is one of the fastest growing districts in Pennsylvania. The influx of population is presumably a consequence of suburban growth extending out from New York and Philadelphia. The district consists of an unusual blend of urban and rural areas.

The urbanized areas of Allentown, Bethlehem, and Easton, located in the Lehigh Valley, along with the City of Reading in Berks County, are the economic hubs of the region. A large proportion of the region's population lives in or near these two metropolitan areas and this has resulted in serious congestion issues, particularly in and around Allentown. Though the core of the region has a predominantly urban character, the outlying parts of the region, especially Schuylkill, Carbon, and Monroe Counties, are decidedly rural in nature.

The Pocono Mountains, with its 2,400 square miles of mountains, lakes, rivers, waterfalls, and woodlands, are a major tourism generator for the northeast corner of Pennsylvania. This mountain range and surrounding attractions bring an average of 27.9 million yearly visitors to Wayne, Pike, Monroe, and Carbon counties.

I-78 is the main east-west route in the District, traveling through northern Berks County and the Lehigh Valley. Within the Lehigh Valley, US 22 parallels I-78 and provides access to many of the businesses and communities in the area. The Northeast Extension has exits for Allentown, Mahoning Valley, Route 903, and Pocono. The Pocono interchange provides a connection to I-80, which runs east-west through Carbon and Monroe Counties. The Reading Area includes junctions between US Routes 222 and 422, as well as I-176 which connects to the mainline Turnpike (I-76) near Morgantown.

District 8-0

District 8-0 is located in south-central Pennsylvania and consists of eight counties: Adams, Cumberland, Dauphin, Franklin, Lancaster, Lebanon, Perry, and York. Six planning organizations are included within the District. Tri-County Planning Commission covers Cumberland, Dauphin, and Perry Counties, while the remaining counties have their own planning organizations.

The capital of Pennsylvania, Harrisburg, is located in this Region, and contains the headquarters for PennDOT, the Pennsylvania Emergency Management Agency (PEMA), the Pennsylvania State Police (PSP), and the Pennsylvania Turnpike Commission (PTC). Other cities in the District include Lancaster, York, and Lebanon. Lancaster County is a popular tourist destination, with its Amish community a major attraction.

Meanwhile, the City of Lancaster is one of the fastest growing cities in the state, with a dense, walkable downtown area. The City of York is notable for a downtown which features numerous well-preserved historic structures from the 18th and 19th centuries.

Three major interstates run through District 8-0, I-76 (Pennsylvania Turnpike), I-81, and I-83, with all three meeting in the vicinity of Harrisburg. I-76 runs east-west across the state, while I-83 runs north-south between Harrisburg and Baltimore, MD. I-81 runs northeast/southwest through the District and is a particularly notable national freight corridor.

In addition to these interstates, the District is home to major US Routes, including US 15, running through Gettysburg and Harrisburg, and US 30, running through Chambersburg, Gettysburg, York, and Lancaster. Other US routes in the District include US 11, 222, and 322.

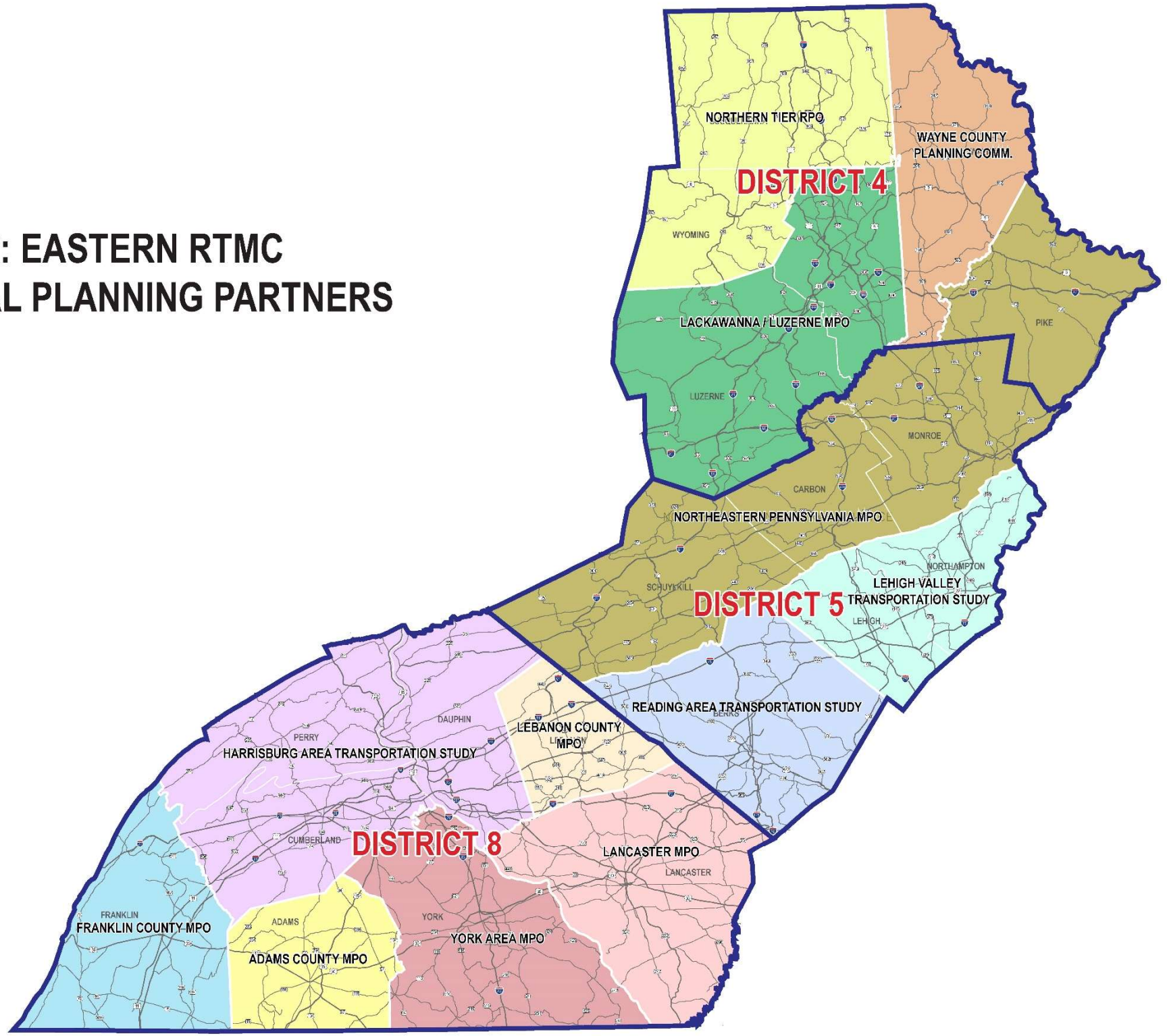
ERTMC Planning Partners

The planning partners within the Eastern Region include:

- Adams County MPO
- Franklin County MPO
- Harrisburg Area Transportation Study (HATS)
- Lackawanna/Luzerne MPO
- Lancaster MPO
- Lebanon County MPO
- Lehigh Valley Transportation Study
- Northeastern Pennsylvania Alliance (NEPA) MPO
- Northern Tier RPO
- Reading Area Transportation Study
- Wayne County Planning Commission
- York Area MPO

Figure 2 shows a map of the various planning partner areas within the region.

FIGURE 2: EASTERN RTMC REGIONAL PLANNING PARTNERS



Key Regional Stakeholders

As part of an extensive outreach process for this ROP update, the project management team developed a ROP steering committee and ROP stakeholders group. The ROP stakeholders group consisted of key organizations that participate in transportation operations planning and implementation within the region. The following provides a listing of the 2020 ROP stakeholders invited to participate:

- FHWA
- PennDOT Central Office
- PennDOT Districts, 4-0, 5-0, and 8-0
- Adams County MPO
- Franklin County MPO
- Harrisburg Area Transportation Study (HATS)
- Lackawanna/Luzerne MPO
- Lancaster MPO
- Lebanon County MPO
- Lehigh Valley Transportation Study
- NEPA MPO
- Northern Tier RPO
- Pennsylvania Turnpike Commission
- Reading Area Transportation Study
- Wayne County Planning Commission
- York Area MPO
- Transit organizations
- Emergency Responders
- Bicycle advocacy organizations
- City of Harrisburg

The ROP steering committee was established by inviting specific stakeholder group members with extensive knowledge of the region's operations and those that could assist with data gathering. A list of the 2020 ROP steering committee members that were invited to participate is provided in **Table 1**.

TABLE 1: ROP STEERING COMMITTEE

Organization Name	Organization Contact	Roles/Responsibilities	Geographical Coverage
FHWA – PA Division	Dan Walston christopher.walston@dot.gov	Transportation Operations Program Manager	Statewide
PennDOT Bureau of Maintenance and Operations	Frank Cavataio fcavataio@pa.gov	Managing statewide transportation management and operations	Statewide
	Pierce Sube piercsube@pa.gov		
PennDOT District 4-0	Jeffrey Fuhr jfuhr@pa.gov	Asst. District Traffic Engineer	Lackawanna, Luzerne, Pike, Susquehanna, Wayne and Wyoming Counties.
	Dan Fox dafox@pa.gov	District ITS/TMC Engineer	
PennDOT District 5-0	Derrick Herrmann deherrmann@pa.gov	Assistant District Traffic Engineer	Berks, Carbon, Lehigh, Monroe,

Organization Name	Organization Contact	Roles/Responsibilities	Geographical Coverage
PennDOT District 5-0	Jose Lopez-Rocha jlopezroch@pa.gov	District ITS/TMC Engineer	Northampton and Schuylkill Counties.
PennDOT District 8-0	Christopher Flad cflad@pa.gov	District ITS & Congestion Management Manager	Adams, Cumberland, Dauphin, Franklin, Lancaster, Lebanon, Perry and York Counties.
	Matthew Clouser maclouser@pa.gov	District ITS/TMC Supervisor	
	Marc Schmiedel mschmiedel@pa.gov	ITS/TMC Specialist	

There were four steering committee meetings and three rounds of stakeholder meetings. A summary of steering committee and stakeholder group activities is provided in **Table 2** and **Table 3**, respectively. Meeting minutes can be found in **Appendix A**.

TABLE 2: SUMMARY OF STEERING ACTIVITIES

Steering Round	Summary of Activities	Location	Date
1	• Discussion of needs identified in previous ROPs • Overview of material to be presented at stakeholder meetings • Discussion of PennDOT One Map tool	PEMA Building, Harrisburg	November 6, 2019
2	• Discussion of stakeholder meeting feedback • Discussion of operational needs and issues • Overview of material to be presented at stakeholder meetings	PEMA Building, Harrisburg	January 22, 2020
3	• Discussion of draft ROP projects • Overview of material to be presented at stakeholder meetings	Skype meeting	April 16, 2020
4	• Presentation of final ROP document • Final review of ROP projects	Teams meeting	August 20, 2020

Stakeholder meetings were held in each of the three PennDOT Districts within the region. Each meeting was comprised of a presentation of information by the project team, followed by breakout sessions to receive

input from the assembled stakeholders on each phase of the ROP development. **Table 3** shows the list of stakeholder activities.

TABLE 3: SUMMARY OF STAKEHOLDER ACTIVITIES

Stakeholder Round	Summary of Activities	Location	Date
1	• Overview of TSMO, the previous ROP, and process for the current ROP • Introduction to PennDOT One Map • Breakout sessions discussing initial maps of One Map data including bottlenecks, crash clusters, and notable special events	PennDOT District 4-0	January 13, 2020
		PennDOT District 5-0	November 18, 2019
		PennDOT District 8-0	December 19, 2019
2	• Discussion of tools and strategies from the TSMO Guidebook • Breakout sessions discussing regional issues and needs and tools and strategies that can be applied	PennDOT District 4-0	February 12, 2020
		PennDOT District 5-0	February 25, 2020
		PennDOT District 8-0	February 28, 2020
3	• Overview of types of proposed projects • Breakout sessions discussing and reviewing draft ROP projects	Teams Meeting (PennDOT District 4-0)	May 12, 2020
		Teams Meeting (PennDOT District 5-0)	May 18, 2020
		Teams Meeting (PennDOT District 8-0)	May 13, 2020

Region's ITS and Operations Vision and Planning Process

The following sections provide an overview of the most recent LRTP for each of the Eastern RTMC Region's planning partners. LRTP Projects related to TSMO or operations are noted.

Adams County MPO

The Adams County MPO adopted their 2040 LRTP on July 2017. The plan was developed with the following transportation goals in mind:

- Evaluate existing comprehensive plan data and recommendations pertaining to transportation planning and to identify an adequate policy framework for future update strategies.
- Assess the current transportation system in terms of accessibility, use, capacity, connectivity, energy efficiency, and safety especially with regard to the future fiscal health of Adams County community revitalization and sustainability and the demands of alternative future growth scenarios.
- Identify, through broad public participation and citizen involvement approaches, emerging social and economic issues which generate special needs upon the county's transportation system.

- Evaluate the future transportation demands on the county transportation system, in response to emerging land use and socioeconomic trends which will directly affect system capacity and performance.
- Identify the need and opportunity for enhanced public transit service in Adams County and to construct a policy decision-making framework to address this issue.
- Identify needs and opportunities for increased development of pedestrian and bicycle modes of transport within the county.

To improve congestion management, the MPO adopted the 2007 Regional Operations Plan (ROP) which covered PennDOT District 8-0. The current LRTP includes congestion management improvements through the following projects:

- Eisenhower Drive Extension from High Street to Route 116
- US Route 15/US Route 30 Interchange Reconstruction
- US Route 15/US Route 94 Interchange Reconstruction
- Camp Letterman Drive Connection
- Gettysburg Borough and Route 30 in Straban Township ITS Implementation

The current LRTP includes several safety improvements that have not yet been programmed to be completed but when funds become available the list of projects can be reviewed for implementation. The Gettysburg Inner Loop Trail System has been identified as a bicycle, pedestrian, and non-motorized project to be programmed when funds become available.

The existing 2007 ROP recommended the congestion management project for the US Route 15/US Route 30 Interchange Reconstruction and to date the preliminary engineering has been completed.

Franklin County MPO

The Franklin County LRTP 2018- 2043 interim update was adopted in 2018. The primary goals and objectives of the Franklin County LRTP included:

- Emphasize the preservation of the existing transportation system – Prioritize improvements that seek to maintain or improve the quality of the existing transportation system.
- Encourage an integrated transportation and land use planning process throughout Franklin County.
- Increase the safety and security of the transportation system for motorized and nonmotorized users.
    - Identify and reduce potential conflicts between applicable modes throughout the transportation system.
    - Identify and implement solutions that reduce or eliminate hazards.
- Support the economic vitality of the metropolitan area.

  - Provide a transportation system that is safe and efficient for economic development that is consistent with local and county plans.
  - Accommodate freight demands with minimized conflicts with other vehicular and non-motorized traffic.
- Increase the accessibility and mobility options available to people and for freight.
  - Promote and increase the use of alternative modes of travel.
  - Incorporate applicable modal needs into transportation system improvements.
  - Identify needed non-motorized system improvements and seek to identify financial and/or institutional implementation mechanisms.
- Promote efficient system management and operation.
  - Address factors that regularly result in congestion.
- Enhance the integration and connectivity of the transportation system.
  - Identify and eliminate connectivity gaps in the transportation system.
- Protect and enhance the environment.
  - Protect key natural resources identified through local and county comprehensive plans and related documents.
  - Enhance the transportation system to improve air quality and support energy conservation.
  - Maintain quality of life through integrated transportation and land use planning.

To improve roadway system management and operations, the MPO has projects prioritized in their LRTP for traffic signal improvements at the following locations:

Near-Term

- Buchanan Trail – This project includes the extension of the existing signal at Antrim Church Road/John Wayne Drive and Buchanan Trail to include the northbound ramps of I-81, including detectors on the ramps to prevent backups on the mainline of I-81. In conjunction with this installation, John Wayne Drive will be made one-way away from Buchanan Trail for at least the first few hundred feet. The intersection of Grindstone Mill and John Wayne Drive would be signalized, if warranted, to facilitate truck traffic.

Intermediate

- Wayne Avenue – Extend interconnect between Orchard Drive and McKinley Street using fiber optic cable ($215,000)
- Route 11 – Install dial-up equipment to extend interconnect to isolated intersections
- Route 11 – Adaptive traffic signal control along the entire corridor

- Route 30 West End – Extend fiber optic cable from West Side Plaza to Federal Street ($122,500)

Long-Term

- Central Traffic Signal & ITS Software Upgrade
- I-81 Detours ITS Project
- Geometry upgrades at Solenberger Road & West End Plaza

Harrisburg Area Transportation Study

The Harrisburg Area MPO adopted its current LRTP on December 14, 2018 with a planning horizon year of 2040. This plan includes Cumberland, Dauphin and Perry counties in the south-central region. Referred to as HATS (Harrisburg Area Transportation Study), this organization is comprised of technical and coordinating committees that are involved with the analyses and preparation documents for developing the LRTP. The primary goals and objectives of the Harrisburg Area LRTP included:

- Provide an efficient, seamless and reliable transportation system,
- Improve the performance and operation of our transportation system for all modes and all users,
- Expand transportation choices,
- Improve quality of life, promote human health and provide a safe experience for all users,
- Reduce environmental impacts,
- Encourage livable communities and efficient land use, and
- Efficiently utilize existing transportation funds and pursue other funding opportunities for transportation system improvements.

The LRTP includes the following operations-related projects:

- US 322 (Governor Rd) from Sipe Avenue to Elm Avenue – traffic signal improvements, bicycle/pedestrian accommodations, and bus pull-offs
- BRT Technologies – signal overrides, queue jumps, and signal timing for congested corridors on Capital Area Transit routes
- Other signal improvement projects
- Expansion of Capital Area Greenbelt and other bicycle/pedestrian network improvements
- Expansion of fixed route transit services

Lackawanna/Luzerne MPO

The Lackawanna-Luzerne MPO 2040 LRTP was adopted on February 17, 2016. The transportation plan goals include:

1. Support the economic vitality of the region, especially by enabling global competitiveness, productivity, and efficiency by increasing the accessibility and mobility options available to people and goods;
2. Increase the safety and security of the transportation system for motorized and nonmotorized users;
3. Protect and enhance the environment, promote energy conservation, improve quality of life, and promote consistency between transportation improvements and state and two county area planned growth and economic development patterns;
4. Enhance integration and connectivity of the transportation system across and between modes, for people and freight, in an effort to promote efficiency in system management and operation;
5. Emphasize preservation and connectivity of the existing transportation system (all modes);
6. Ensure consistency with the fundamental principles of Title VI and Environmental Justice

The Lackawanna-Luzerne planning region identifies the following transportation problem areas:

- Need for passenger rail between Scranton and NJ/NY/Philadelphia
- Improved transit service
- Improved roadway conditions
- Improvements to I-81
- More trails and connections
- Need for bike lanes
- Safety Improvements
- Improved pedestrian access and safety

Lancaster MPO

The Lancaster MPO's 2020 Metropolitan Transportation Plan (MTP) *Connects2040* provides a guide for improving, operating, and maintaining their transportation system through the year 2045. It was developed to be responsive to planning requirements and priorities at the federal, state, and county levels, and is consistent with *places2040: Thinking Beyond Boundaries*, Lancaster County's comprehensive plan.

Lancaster County's population is growing and aging, while freight traffic is increasing and carrying heavier loads. These factors are putting additional demand on the transportation system for intermodal connectivity and well-maintained infrastructure. New services and facilities will be needed to meet the mobility needs of all users of the transportation system - particularly members of the community who rely on public transit.

The vision of the MTP is to "equitably meet the mobility needs of residents, businesses, and visitors while strengthening the unique identity of Lancaster County through an environmentally responsible, safe, and reliable multi-modal transportation system."

Lebanon County MPO

The Lebanon County MPO is currently in the process of updating their LRTP, with an anticipated completion in 2020. This update includes expanded public involvement such as a survey and an online interactive map to best capture the transportation needs of the county.

The most recent completed LRTP for Lebanon County was the 2017-2040 update, finalized in 2016. This plan was organized around the following six goals:

- Provide a safe and secure transportation system
- Provide a multi-modal system that is efficient, interconnected and accessible
- Promote a sustainable transportation system that complements the county's natural and built environment
- Meet the challenges and opportunities of growth through collaborative planning, funding, and project implementation
- Target investments for maximum local and regional benefit and impact
- Utilize all available funding sources to finance investments for the transportation network

In keeping with the TSMO philosophy, the LRTP notes that Lebanon County views capacity-adding projects as the exception, not the rule, to solving the county's transportation problems. The MPO identifies $7,600,000 in ITS-related studies and improvements over the span of the LRTP, including the following medium-term (5-12 years) needs:

- Implement small-scale ROP projects (as defined in District 8-0 ROP)
- Incident management system on I-81 (Six CCTV cameras and replacement of one DMS)
- Incident management system on other major routes (detour and advanced warning systems)

Lehigh Valley Transportation Study

FUTURELV: The Regional Plan is the latest LRTP for the Lehigh Valley, completed in 2019. It sets the vision and direction for the region (comprised of Lehigh and Northampton Counties) to 2045 and beyond. The plan looks to manage future growth, maximize the region's assets, and provide the chance for everyone to have access to health, opportunity, and a livable neighborhood.

The plan was compiled based on an extensive and varied amount of community engagement, including public meetings, an online survey, and an interactive website. One of the main concerns of residents is the growth of distribution centers throughout the area, with it being named the fastest-growing corridor in the nation for warehousing and logistics. The Lehigh Valley is also unique in that a large number of residents commute to work outside of the region, particularly in Philadelphia, New York City, and New Jersey.

The Plan focuses on creating a transportation network built around centers and corridors. This means reducing sprawl and achieving density to support a more multimodal, accessible transportation system. This includes expanding the existing trail network and improving connectivity so that it can be used for transportation and not just recreation. The plan also includes the implementation of high-frequency bus corridors to move people more efficiently between the major regional centers of Allentown, Bethlehem, and Easton.

Another aspect of the plan's goal of a Connected Mixed-Transportation Region is to "support the expansion of technology, communications and utilities to reduce travel demands, optimize traffic flow and prepare for the next generation of jobs." This includes use of adaptive traffic signals and expansion of the communications network for ITS applications.

The following TSMO-related projects are identified for transportation funding in the LRTP:

- LVTS Urban Intelligent Transportation System – installation of DMS and CCTV cameras at various locations along US 22
- MacArthur Road Adaptive Signal Upgrade – PA-145 from 6th Street to Chestnut Street
- State Route 309 Coopersburg – adaptive signal upgrades
- Freeway Service Patrol – two roaming tow trucks on I-78 from PA-100 to the PA-309 split and I-78/US 22, from PA-100 to PA-33
- ITS Sign Upgrades - Turnpike – installation of DMS along I-78, US 22, and PA-309 near the Turnpike
- Bath Adaptive Traffic Signals – four intersections on Northampton Street and on Main Street
- Adaptive Signal Upgrades – various intersections on Emmaus Avenue from South Albert Street to 31st Street
- Intelligent Transportation Systems and Security Project – purchase/replace/upgrade of ITS technology for LANTA transit operations

Northeastern Pennsylvania Alliance (NEPA) MPO

NEPA is the designated MPO for Carbon, Monroe, Pike, and Schuylkill Counties required to develop and maintain a Transportation Improvement Plan (TIP). The LRTP will span a 25-year period, through the year 2040 and it is intended to serve as a guide for coordinated transportation planning throughout the NEPA MPO Region. The NEPA MPO Long Range Transportation Plan was adopted on March 2016. The LRTP goals and objectives are organized into seven primary themes that are consistent with the required federal planning factors and statewide guidance:

- Support the economic vitality of the region; especially by enabling global competitiveness, productivity and efficiency.
- Increase the security of the transportation system for motorized and nonmotorized uses.
- Increase the safety of the transportation system for motorized and non-motorized uses.
- Increase the accessibility and mobility options for passenger transport.
- Enhance the integration and connectivity of the transportation system across and between modes for passengers.
- Increase the accessibility and mobility options for freight transport.
- Enhance the integration and connectivity of the transportation system across and between modes for freight.
- Protect and enhance the environment, promote energy conservation and improve quality of life.
- Promote efficient system management and operation.
- Emphasize the preservation of the existing transportation system.

Northern Tier RPO

Northern Tier Regional Planning and Development Commission includes planned projects in Wyoming County. Their 2015-2040 Long Range Transportation Plan was adopted March 2015. This LRTP period provides:

- an overview of the most significant trends and issues affecting transportation in Pennsylvania's Northern Tier;
- a framework for transportation decisions to support community development and economic development;
- a financial plan, consistent with state and federal transportation regulations that require long-range plans to be fiscally constrained and determined by Year of Expenditure;
- an analysis of social and environmental impacts of representative projects;
- a listing of projects and line item reserves to be funded with projected state and federal revenue; and
- a meaningful basis for implementation through various planning activities and commitments to environmental coordination.

The LRTP identifies improving on-road bicycling, communities in the region have expressed an interest in developing new off-road walking and bicycling facilities.

Reading Area Transportation Study

The Reading Area Transportation Study completed their 2017-2040 LRTP on July 21, 2016 and it was updated on July 19, 2018. The plan puts a priority on road, bridge, and transit maintenance and safety projects. It calls for nearly $2 billion in transportation projects through 2040. The primary focus of this plan is "asset management" - to maintain and improve the County's transportation system with an emphasis on making better use of existing highway, bridge and transit facilities, while seeking to improve safety and reduce traffic congestion, energy consumption, and motor vehicle emissions. The transportation section of the plan has 5 primary goals:

- To provide and maintain a balanced transportation system that will safely and efficiently move people and goods.
- To develop a maintenance-first philosophy to preserve existing infrastructure through its useful lifecycle.
- To provide a balance of highway, public transportation, aviation, rail, bicycle, and pedestrian systems into a coordinated transportation system.
- To incorporate system safety improvements into all projects and programs.
- To focus system improvements on reducing transportation system congestion to acceptable levels.
- To expand the system only if the previous goals, in conjunction with land use policies, do not produce the desired results.

Projects identified in the LRTP are split into Short-term (1-4 years), Mid-term (5-12 years), and Long-Term (13+years) and address the issues identified through the established goals and performance measures. The LRTP has identified US 222 North as one of the highest priorities for new capacity and safety

improvements and the US 422 West Shore Bypass has a significant maintenance need. In the mid-term, there are major safety improvements planned to occur to PA 12 in Alsace Township at Elizabeth Avenue, Skyline Drive and the Alsace Manor area. The MPO is aware that although driving is the primary means of travel in Berks County, there are indications that due to changing demographics, the decades old trend of increased driving may be slowing. This may mean that more people will rely on alternative modes to get around, such as public transportation, walking and biking.

Wayne County Planning Commission

Wayne County is a non-affiliated independent county for which PennDOT assumes responsibility for the transportation planning and programming duties. The Wayne County Planning Commission has developed the Wayne County Comprehensive Plan which was updated in 2010 and adopted by the Wayne County Commissioners on September 28, 2010. Chapter XIV – Transportation Plan of the document identifies several projects to address the unmet infrastructure and service needs of the County and its constituent municipalities. The corridors identified for expected traffic growth include:

- Route 6 Honesdale and Indian Orchard
- Route 191 in Newfoundland at the I-84 Interchange
- Route 590 at the intersection of Route 191
- Route 296/196 from Waymart Borough to Route 191 in Salem Township
- Routes 196, 371 and 423

York Area MPO

The 2017-2040 York Area MPO LRTP was adopted on June 25, 2009, updated on April 25, 2013, and again on April 27, 2017. The 2017 update addresses the following changes: new data, an extended planning horizon to 2040, federal performance measurements, and new federal planning guidelines. The purpose of the LRTP is to develop a coordinated effort to implement transportation improvements that attempt to achieve York County's future goals. YAMPO developed these goals by public consensus of York County's physical, social, economic, and institutional environments.

Based on the 2017 update, the following operations-related needs were identified:

- Re-timing of 179 traffic signals and inclusion of eight signalized intersections that are not currently coordinated and are less than 1,000 feet from another traffic signal into coordinated signal systems
- Construct multi-use trails along all rail corridors
- Installation of ITS infrastructure as identified in PennDOT's ITS architecture plan
- Transit Signal Priority along congested corridors

Summary of Planning Horizon Times

Each planning organization works on its own schedule for releasing their LRTPs, with each group releasing an updated document approximately every five years. **Table 4** shows the current LRTP planning years and the anticipated year for their next update. Note that, as an independent county, Wayne County Planning Commission does not complete a LRTP.

TABLE 4: LRTP PLANNING YEARS

Organization Name	Current LRTP Planning Years	Anticipated Year for Next Update
Adams County MPO	2017-2040	2022
Franklin County MPO	2018-2043	2023
Harrisburg Area MPO	2017-2040	2022
Lackawanna/Luzerne MPO	2015-2040	2021
Lancaster MPO	2020-2045	2024
Lebanon County Planning Department	2015-2040	2020
Lehigh Valley Transportation Study	2019-2045	2024
Northeastern MPO	2016-2040	2021
NTRPDC	2015-2040	2020
Reading Area Transportation Study	2017-2040	2021
Wayne County Planning Commission	N/A	N/A
York Area MPO	2017-2040	2021

Chapter 2. Existing Regional Demographics and Transportation Elements

Existing Key Transportation Elements

Roadway Network

The roadway network in the Eastern RTMC Region includes interstates, freeways, arterials, collectors, local, municipal, and other agency roads. As reported in PennDOT's 2018 Highway Statistics, the Eastern RTMC Region contains 37,684 linear miles of roadway, encompassing 31.2% of the Commonwealth's total linear mileage.

TABLE 5: EASTERN RTMC REGION LINEAR MILES

County	PennDOT Linear Miles	Other Agencies Linear Miles*	Local County/ Municipal Linear Miles	Total Linear Miles	Total DVMT
Lackawanna	557	31	1,032	1,621	5,059,980
Luzerne	854	72	1,706	2,632	7,624,872
Pike	327	45	260	632	1,564,249
Susquehanna	793	2	1,058	1,853	1,523,064
Wayne	717	4	684	1,405	1,107,489
Wyoming	365	0	397	762	713,650
District 4-0	3,614	153	5,137	8,904	17,593,304
Berks	875	59	2,399	3,333	9,368,480
Carbon	269	122	402	793	2,147,586
Lehigh	534	26	1,547	2,107	8,422,727
Monroe	518	30	1,021	1,568	4,492,235
Northampton	495	11	1,530	2,037	6,170,380
Schuylkill	599	17	1,268	1,883	3,594,253
District 5-0	3,290	265	8,167	11,722	34,195,661
Adams	544	38	840	1,421	2,471,433
Cumberland	556	85	1,332	1,974	7,756,751
Dauphin	557	15	1,352	1,924	7,710,595
Franklin	613	29	1,065	1,706	3,934,929
Lancaster	1,041	34	2,833	3,909	12,317,136
Lebanon	369	18	848	1,235	3,387,090
Perry	418	14	600	1,032	1,408,996
York	1,132	43	2,682	3,856	9,040,293
District 8-0	5,228	276	11,553	17,057	48,027,223
Eastern RTMC Region Total	12,132	695	24,856	37,684	99,816,188

**Other agencies include Turnpike toll roads and other state and federal agencies, such as state universities, national parks, etc.*

Transit Service

The region is served by multiple transit systems offering fixed route service and demand responsive service. The following agencies provide fixed route and demand responsive transit service in the region:

Fixed Route Bus	Shared-Ride/Demand Response Only
Berks Area Regional Transportation Authority (BARTA)* Capital Area Transit (Dauphin and Cumberland Counties) Carbon County Community Transit (CCCT) County of Lackawanna Transit System (COLTS) Hazleton Public Transit Lehigh and Northampton Transportation Authority (LANTA) Lebanon Transit Luzerne County Transportation Authority (LCTA) Monroe County Transportation Authority (MCTA) rabbittransit (York and Adams Counties) Schuylkill Transportation System (STS) Red Rose Transit Authority (Lancaster County)*	Lackawanna County Coordinated Transportation Luzerne-Wyoming County Trans. Dept Pike County Transportation Department Susquehanna-Wyoming County Transportation Wayne County Area Agency on Aging

** operate under South Central Transit Authority*

Capital Area Transit (CAT) and rabbittransit also provide intercity and express bus service. CAT provides commuter service to Harrisburg along the following routes: Elizabethville/Millersburg/Halifax, Shippensburg/Newville/Carlisle, and Shippensburg/Newville/Mechanicsburg. Rabbittransit provides commuter services between York and Harrisburg, between York and Northern Maryland, and between Gettysburg and Harrisburg via their rabbitEXPRESS bus lines.

In addition to these transit agencies, a variety of private intercity bus companies also provide service through the region, including:

- Fullington Trailways: provides daily service from many locations in the Eastern Region, such as Harrisburg, Allentown, and Scranton, connecting to locations throughout Pennsylvania as well as New Jersey and New York City.
- Greyhound Lines: operates a number of intercity routes throughout the region with stops in most of the major cities and towns.
- Martz Trailways: operates daily service connecting the Lehigh Valley and Scranton/Wilkes-Barre areas with New York City and Philadelphia.
- Trans-Bridge Lines: offers service from the greater Lehigh Valley to New York City with a number of stops along the route.
- Shortline Bus Company (part of Coach USA): offers bus transportation to the Port Authority in New York City (three trips per day from Honesdale/Hawley and twice daily from Hancock/Deposit).
- Klein Transportation: began service in 2019 between Reading and New York City via the Lehigh Valley. This service replaces some of the routes previously offered by Bieber Transportation which ceased operations earlier in 2019.

Two Amtrak lines run through the Eastern Region with stops in Harrisburg, Middletown, Elizabethtown, Mount Joy, and Lancaster:

- Keystone Service: provides frequent regional service between Harrisburg Transportation Center and 30th Street Station in Philadelphia, with most trains continuing to New York City.
- Pennsylvanian: regional service between New York City and Pittsburgh with one train in each direction daily.

The Eastern Region has many park and ride facilities, particularly in the vicinity of Harrisburg, Wilkes-Barre, Stroudsburg, and the Lehigh Valley. In District 4-0, there are a number of Park and Rides in Luzerne County and Lackawanna County, with some of the largest lots along I-81 at Dorrance and Dupont/Pittson, and along I-80 at White Haven/Freeland. The Dingmans Ferry Park and Ride is another large location. It is located in Pike County on PA-739 near the New Jersey state line.

The largest Park and Ride in the region is located in District 5-0 at the William Penn Highway interchange of PA-33. The site includes 1,180 spaces and is used for carpool commuting and intercity bus connections to New Jersey and New York City. Other large lots in District 5-0 include the Marshalls Creek site at US 209 and Mt. Nebo Road and the Hellertown site at I-78 and PA-412.

District 8-0 has four park and rides with greater than 100 spaces:

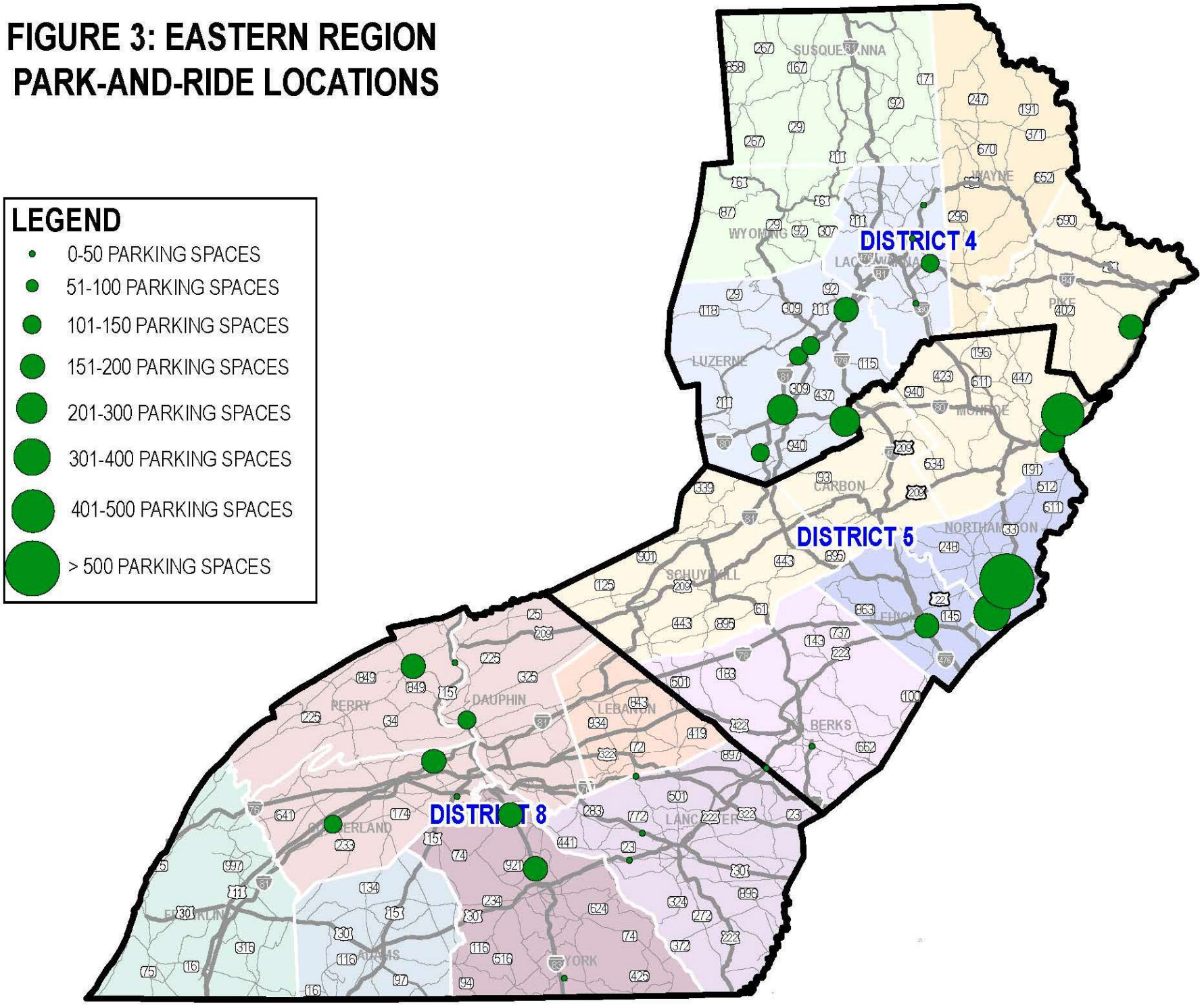
- PA-114 at the I-81 Mechanicsbug exit
- US 22/322 at PA-34, Newport
- PA-238 at I-83 Emigsville exit
- PA-392 at I-83 Yocumtown exit

A map of the region's PennDOT-owned Park and Ride locations is provided as **Figure 3**. In addition to these lots, a number of other unofficial lots can also be found throughout the region.

Commuter Services of Pennsylvania

Commuter Services is a professionally staffed organization overseen by the non-profit Susquehanna Regional Transportation Partnership, composed of MPO, Chamber, and Transit members from the 9-county southcentral Pennsylvania region, and supported by federal Congestion Mitigation & Air Quality funds. They provide a variety of free services to reduce traffic congestion by helping commuters find alternatives to driving alone, and by reaching out to employers so they can help their workforce find those options. This includes providing information on transit service, walking, biking, and telecommuting. They help commuters find carpool partners and organize vanpools. Other programs include ridesharing and emergency ride home reimbursement options. More information can be found at pacommuterservices.org.

FIGURE 3: EASTERN REGION PARK-AND-RIDE LOCATIONS



Active Transportation Network

Limited on-street bicycle infrastructure exists within the region, but a number of well-used trails are spread throughout the area, with plans to expand and improve them in varying stages. The Schuylkill River Trail extends northwest from Philadelphia and will eventually reach to Pottsville. Currently within the region, a section from Pottstown to Reading is mostly complete with only a limited on-road portion. The D&L Trail spans 165 miles from northeast Pennsylvania to the Lehigh Valley and Bucks County. The Capital Area Greenbelt provides a 20 mile loop through and around Harrisburg. Other popular trails include the Enola Low Grade Rail Trail and Conewago Recreation Trail in Lancaster County and the O&W, D&H, Lackawanna River Heritage, and Luzerne County Levee Trails in northeastern Pennsylvania. In November 2018, the existing and proposed trail network in the Lehigh Valley was branded as THE LINK with a goal of filling gaps and facilitating construction of a continuous trail system from the Lehigh Valley to Philadelphia.

The statewide BicyclePA network, largely used for recreational/touring purposes, includes five routes through the Eastern RTMC Region:

- PA Bike Route J: north-south route which runs from Maryland to New York through Central Pennsylvania, generally following the Susquehanna River. It also includes three spur routes: J1 (connecting Harrisburg to Lancaster), J2 (connecting Harrisburg to Gettysburg), and JS (east-west connector to Route S).
- PA Bike Route L: north-south route which runs from Delaware to New York, passing through the Berks County, the Lehigh Valley, and the Scranton/Wilkes-Barre area. Spur Route L1 connects Mertztown to Trexlertown.
- PA Bike Route S: east-west route running from West Virginia to New Jersey through the southern part of Pennsylvania. In the Eastern Region, the route passes through York, Lancaster, and southern Berks County.
- PA Bike Route V: east-west route across central Pennsylvania, generally paralleling I-80. It runs mostly through Luzerne and Monroe Counties in the Eastern Region.
- PA Bike Route Y: east-west route across northern Pennsylvania, mostly following US 6 through Wyoming, Lackawanna, Wayne, and Pike Counties in the Eastern Region.

In addition, Harrisburg Bike Share has been operating in the City of Harrisburg since 2017. This bike share network includes 11 stations located throughout the city with a total of over 50 bicycles available to use. Per a news release in July 2019, the number of annual members had increased from 1,990 to 5,140 over the previous year, and the number of rides had increased from 9,397 to 15,988. In addition to annual membership, "Pay As You Go" rides can also be purchased for $2 per hour up to $20.

Two bike share programs are located in the Lehigh Valley, at Lehigh University and Muhlenberg College. The Lehigh system is for students, faculty, and staff only. The Muhlenberg system is open to the public and co-sponsored by Allentown Parking Authority. The Lehigh program began in 2015 and was following by the Muhlenberg program which launched towards the end of 2018. Riders sign up for an annual membership plan which includes two free hours for each ride, with a small additional fee for each additional 30 minutes. The programs do also provide an hourly program as well.

The bike share systems mentioned above, as well as systems in York, Lancaster, Reading, and Hershey were operated by Zagster, a venture-funded startup company. As of June 2020, they had ceased operations nationwide. Finding new operators for these bike share systems should be prioritized. Commuter Services of Pennsylvania has hosted discussions with several of these bike share communities to discuss next steps. Continued coordination is expected in order to restore these services in the region.

A few smaller bike share systems in the region were not operated by Zagster. One example is the Lackawanna Heritage Valley Authority which operates a free bike share program in the Scranton area.

Airports

There are 15 public airports operating in the region. Airports providing commercial service include:

- Harrisburg International Airport
- Lancaster Airport
- Lehigh Valley International Airport
- Wilkes-Barre/Scranton International Airport

Other non-commercial airports include:

- Braden Airpark
- Capital City Airport
- Cherry Ridge Airport
- Franklin County Regional Airport
- Gettysburg Regional Airport
- Hazleton Regional Airport
- Jake Arner Memorial Airport
- Pocono Mountains Municipal Airport
- Queen City Municipal Airport
- Reading Regional Airport
- Schuylkill County Airport
- Wilkes-Barre Wyoming Valley Airport

Freight Network

Trucking

Much of the Eastern Region has seen a boom in distribution centers, particularly along the I-81 corridor and in the Lehigh Valley. This has led to increasing truck traffic on the region's interstates as well as many state and local roads. The 2016 Pennsylvania Comprehensive Freight Movement Plan determined the Top 100 Truck Bottlenecks in the state. Notable Truck Bottlenecks from this list included:

- Capital Beltway, Harrisburg
- I-83, north of York
- I-78/US 22, Lehigh Valley
- I-81, north of Frackville

In addition to congestion, the combination of increasing truck traffic with new federal hours-of-service regulations have caused increasing demand for truck parking. The shortfall in truck parking causes safety issues as more trucks can be found parking in dangerous areas such as on shoulders and freeway ramps.

Figure 4 shows the Critical Rural and Critical Urban Freight Corridors in the region. Note that these are non-interstate corridors. These routes combine with FHWA's Primary Highway Freight System (mostly interstates) to provide the key trucking corridors in the region.

Rail

NORFOLK SOUTHERN

The Harrisburg Area is served by Norfolk Southern which is the primary provider of the rail freight service. The Norfolk Southern Harrisburg Line is expected to remain critical and is currently expanding capacity.

There is a 56-mile rail line between Athens in Bradford County, and Mehoopany, in Wyoming County. The line connects with Norfolk Southern's own operations from Athens to Gang Mills, NY. The Lehigh Railway (LRWY) operates services on the line. LRWY utilizes seven locomotives and nine employees to operate and maintain the line.

In York County, Norfolk Southern has approximately 30 miles of track and links with other rail lines and inter-modal facilities.

CSX CORPORATION

CSX provides services over 32,000 miles of track in 23 states in the Eastern and Southern U.S. and in Canada. In York County, CSX operates on approximately 15 miles of track and links with the York Railway operated lines. The CSX line operates in the southwestern corner of York County. CSX also operates in Adams and Franklin Counties.

CANADIAN PACIFIC RAIL

The Canadian Pacific Rail through Susquehanna County is one of the most important north-south lines in the northeastern United States. The line funnels traffic as it moves west to Buffalo and Toronto, north to New England and Montreal, and south to Allentown, Harrisburg, and southern New Jersey. The line connects with Reading Blue Mountain and Northern at Pittston Junction in the Scranton/Wilkes-Barre area, Norfolk Southern in Binghamton, NY, and CSX and ports in Philadelphia.

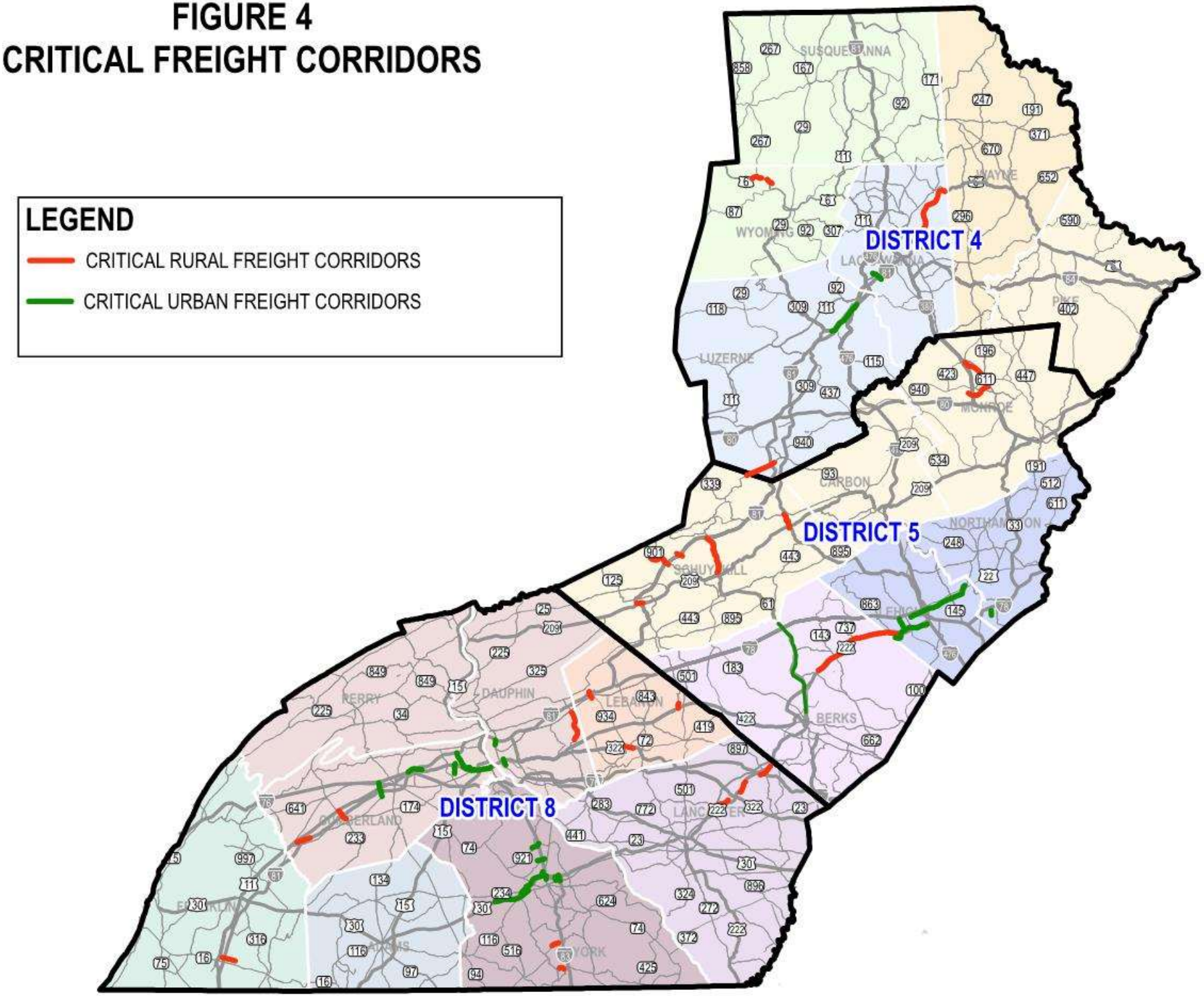
NORTHEASTERN PENNSYLVANIA REGIONAL RAILROAD AUTHORITY

The Northeastern Pennsylvania Regional Railroad Authority operates 100 miles of trackage in four counties and connects with Norfolk Southern at the Taylor Intermodal yards. They carry both freight and excursion passenger service trains.

READING BLUE MOUNTAIN AND NORTHERN RAILROAD

The Reading Blue Mountain and Northern Railroad is a privately-held railroad company serving major businesses in nine Eastern Pennsylvania counties (Berks, Bradford, Carbon, Columbia, Lackawanna, Luzerne, Northumberland, Schuylkill, and Wyoming). The railroad runs about 400 miles from Reading to Mehoopany and it also operates the 7-mile rail line from Towanda to Monroeton in Bradford County. This railroad offers both freight and passenger services. Passenger services are limited to seasonal tourist runs, mostly on weekends.

FIGURE 4
CRITICAL FREIGHT CORRIDORS



STOURBRIDGE RAILROAD COMPANY

In Wayne County, the Stourbridge Railroad Company provides freight service and supports a tourist excursion program over the line of railroad between Lackawaxen (Pike County) and Honesdale. It connects with the Central New York Railroad providing access to the national rail system and multiple carriers. The mainline along the Delaware River likewise serves a valuable role with respect to Wayne County agriculture.

YORK RAILWAY COMPANY (YRC)

Genesee & Wyoming Inc. is a leading owner and operator of short line and regional freight railroads serving more than 800 customers on nearly 10,000 miles of track in five different countries. YRC, a subsidiary of Genesee & Wyoming Inc., operates 42 miles of track through the center of York County. YRC operates mainline track that links the City of York with the Hanover Area and connects to CSX and Norfolk Southern tracks.

SHORT LINES

- Steelton and Highspire Railroad provides access between Pennsylvania Steel Technologies.
- Middletown and Hummelstown Railroad operates a short line between Middletown and Hummelstown in Dauphin County.
- Gettysburg and Northern Railroad operates a 25-mile long line between Gettysburg in Adams County and Mount Holly Springs in Cumberland County.
- Columbia & Reading Railroad operates a short line in Columbia Borough and West Hempfield Township.
- Lancaster Northern Railroad operates track from Ephrata northeast to interchange with Norfolk Southern Railway in Reading.
- Landisville Terminal Railroad operates a short line between Amtrak's Harrisburg line and West Hempfield, Lancaster County.
- The Strasburg Railroad is the oldest continuously operating railroad in the western hemisphere and the oldest public utility in Pennsylvania. Today it is primarily known for its excursion trains which run through Pennsylvania Dutch Country.
- East Penn Railroad operates a number of branch lines (approximately 110 track miles total) throughout southeastern Pennsylvania and northern Delaware, including Berks and Lancaster Counties.

Air Cargo

Shipping freight by air is typically the quickest and most reliable, yet most costly transportation mode. Therefore, it is reserved for highly perishable, time-sensitive, or particularly high value commodities moving over large distances. Air cargo plays a critical role in supporting emerging high-tech and biomedical industries in the state. It is also more frequently used as delivery timelines shorten for online shopping. Two of the top five freight cargo airports in the state are located within the Eastern Region – Harrisburg International Airport and Lehigh Valley International Airport. The other commercial service airports in the region are Lancaster Airport and Wilkes-Barre/Scranton International Airport.

Tourist and Travel Destinations

The Eastern RTMC region is also home to tourist and travel destinations including:

TABLE 6: EASTERN RTMC REGIONAL ATTRACTIONS

Destination Type	Name
Amusement Parks	Camelbeach Mountain Waterpark Dorney Park & Wildwater Kingdom Dutch Wonderland Great Wolf Lodge Hersheypark Kalahari Resorts Knoebels Amusement Park
Amusement Parks	
Caves and Mines	Crystal Cave Indian Echo Caverns Lackawanna Coal Mine Lost River Caverns No. 9 Mine and Museum Pioneer Tunnel Coal Mine & Steam Train
Sporting Events/Facilities	Buck Motor Sports (Providence) Clipper Magazine Stadium (Lancaster) Coca-Cola Park (Allentown) FirstEnergy Stadium (Reading) FNB Field (Harrisburg) Giant Center (Hershey) Maple Grove Raceway (Mohnton) Mohegan Sun Arena at Casey Plaza (Wilkes-Barre) PeoplesBank Park (York) PNC Field (Moosic) Pocono Raceway (Long Pond) PPL Center (Allentown) Santander Arena and Performance Arts Center (Reading)
Universities and Colleges	Albright College Alvernia University Bloomsburg University of Pennsylvania Cedar Crest College Clarks Summit University Dickinson College East Stroudsburg University of Pennsylvania Elizabethtown College Franklin and Marshall College Gettysburg College Harrisburg University of Science and Technology Harrisburg Area Community College Johnson College Keystone College King's College Kutztown University of Pennsylvania Lackawanna College Lafayette College Lancaster Bible College Lebanon Valley College

Destination Type	Name
Universities and Colleges	Lehigh University Lutheran Theological Seminary at Gettysburg Marywood University Messiah College Millersville University of Pennsylvania Misericordia University Moravian College Muhlenberg College Penn State (9 campuses throughout region) Pennsylvania College of Art and Design Pennsylvania College of Health Sciences Reading Area Community College Shippensburg University of Pennsylvania Susquehanna University The Art Institute of York – PA The Commonwealth Medical College University of Scranton Widener University – Harrisburg Campus Wilson College Yeshivath Beth Moshe York College
Entertainment and Special Events	American Music Theater (Lancaster) Carlisle car shows City of Lancaster First Fridays City of Lancaster Music Fridays Field of Screams (Mountville) Fulton Opera House (Lancaster) The Great Allentown Fair Hamburger Festival (Hamburg) Jim Thorpe seasonal events Koziar's Christmas Village (Bernville) Long's Park Summer Concert Series Mohegan Sun Pocono casino (Wilkes-Barre) Musikfest (Bethlehem) Pennsylvania Renaissance Faire (Manheim) Stabler Arena (Bethlehem) Strasburg tourism Toyota Pavilion at Montage World War II Weekend (Reading) Wind Creek Casino (Bethlehem) York Fairgrounds

Destination Type	Name
Parks and Recreation	Back Campus Trails at Keystone College Back Mountain Trail Blue Marsh Lake Capital Greenbelt Carbondale Riverwalk Davis Trail Delaware Water Gap National Recreation Area Eales Preserve Gettysburg National Military Park Greater Hazleton Rail Trail Lackawanna State Park Trails Lake Scranton Walking Trail Lackawanna River Heritage Trail Lehigh Gorge Trail Lehigh River Water Trail Luzerne County Levee Trail Luzerne County National Park Mocanaqua Loop Mount Penn Preserve Neversink Mountain North Branch Susquehanna River Water Trail Northwest River Trail Penobscot Ridge Mountain Bike Trail Schuylkill River Trail Schuylkill River Water Trail South Abington Park Steamtown National Historic Site Susquehanna Warrior Trail Trolley Trail Union Canal Trail West Side Trail York County Heritage Rail Trail

Major Employers

Figure 5 displays the number of employees in various industries, based on the 2013-2017 American Community Survey. Educational services, health care, and social assistance are the top industries in the region by a large margin. This group is led by a number of colleges and universities as well as strong healthcare systems like Lehigh Valley Health Network, WellSpan Health, Tower Health, and UPMC Pinnacle. Other major employers include Amazon, Wal-Mart, East Penn Manufacturing, and the state and federal governments.

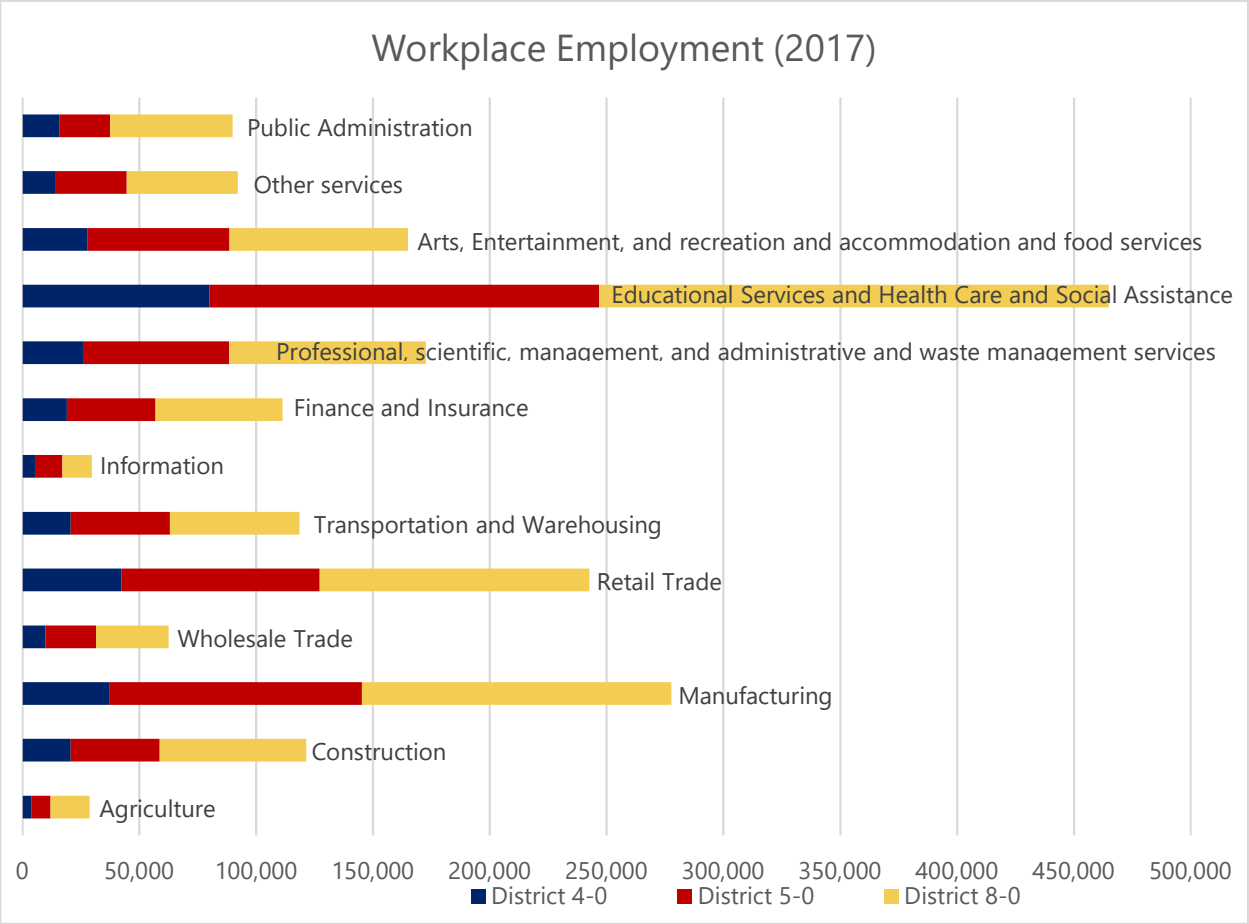


FIGURE 5: MAJOR INDUSTRIES IN THE REGION

Demographics

The following tables, also based on the American Community Survey, show the demographics and commuting patterns of the region. Data is based on workers' place of residence, not employment.

TABLE 7: COUNTY AND DISTRICT POPULATIONS

District	Population	Percent of Regional Total
Lackawanna	211,960	5.18%
Luzerne	318,222	7.77%
Pike	55,687	1.36%
Susquehanna	41,716	1.02%
Wayne	51,656	1.26%
Wyoming	27,760	0.68%
District 4-0	**707,001**	**17.26%**
Berks	415,500	10.14%
Carbon	63,987	1.56%
Lehigh	360,774	8.81%
Monroe	167,306	4.08%
Northampton	300,941	7.35%
Schuylkill	144,287	3.52%
District 5-0	**1,452,795**	**35.47%**
Adams	101,589	2.48%
Cumberland	245,801	6.00%
Dauphin	273,329	6.67%
Franklin	153,003	3.74%
Lancaster	536,494	13.10%
Lebanon	137,616	3.36%
Perry	45,878	1.12%
York	442,216	10.80%
District 8-0	**1,935,926**	**47.27%**
Total Population in the Region	**4,137,592**	

(SOURCE: US CENSUS BUREAU, 2013-2017 AMERICAN COMMUNITY SURVEY 5-YEAR POPULATION ESTIMATES)

TABLE 8: COMPARISON OF KEY DEMOGRAPHICS

Demographic Factor	District 4-0	District 5-0	District 8-0	Pennsylvania	United States
Total Population	707,001	1,452,795	1,935,926	12,790,505	321,004,407
% Minority Population	8.8%	16.5%	6.7%	18.9%	27.0%
Median Age (In Years)	45.3	42.3	41.1	40.7	37.8
Mean Family Size	2.45	2.56	2.51	2.47	3.24
Per Capita Income	$27,777	$28,497	$30,043	$31,476	$31,177
% Below Poverty Level	14.2%	12.2%	6.2%	13.1%	14.6%

TABLE 8: COMPARISON OF KEY DEMOGRAPHICS (CONT'D)

Commuting Pattern	District 4-0	District 5-0	District 8-0	Pennsylvania	United States
Total Workers 16 & Over	317,159	680,608	943,260	5,976,599	148,432,042
% Commuters Driving Alone	81.5%	81.1%	81.3%	76.4%	76.4%
% Commuters Carpooling	9.8%	9.0%	7.4%	8.5%	9.2%
% Commuters Using Public Transportation	1.1%	1.9%	1.0%	5.6%	5.1%
Mean Travel Time to Work (Minutes)	28.4	28.9	25.3	26.7	26.4

(SOURCE: US CENSUS BUREAU, 2013-2017 AMERICAN COMMUNITY SURVEY 5-YEAR ESTIMATES)

TSMO Roadway Tiering System

As with any planning effort, it is important to define the scope of the roadway network. With input from statewide and District-level PennDOT representatives, as well as from planning partners, a roadway tiering system was developed to facilitate TSMO planning efforts, shown in the following table.

TABLE 9: ROADWAY TIERING SYSTEM

Road Type	Tier	Criteria
Limited Access (NHS)	1A	AADT > 75,000
	1B	AADT between 50,000 and 75,000
	1C	AADT < 50,000
Non-Limited Access (NHS)	2A	AADT > 25,000
	2B	AADT between 10,000 and 25,000
	2C	AADT < 10,000
Non-NHS	3A	AADT > 10,000
	3B	AADT between 2,000 and 10,000
	3C	AADT < 2,000

The intent of the tiering system is to organize the roadway network into groups with similar characteristics and operational needs. This helps to consistently define expectation for management and operations across the state. While the National Highway System (NHS) roadway types are higher-order roadways with generally higher traffic volumes, the tiering classifications are not intended to dictate specific solutions or levels of funding.

Corridors and Areas of Transportation Significance

The major highway corridors identified in **Table 10** connect the core population centers of the region with each other as well as providing links to key areas outside of the area. Average Daily Traffic was retrieved from PennDOT One Map RMS data. Roads identified as part of the 511PA Core Network are ones which PennDOT has identified as having reliable speed data, road condition reporting, and traffic cameras.

TABLE 10: CORRIDORS AND AREAS OF TRANSPORTATION SIGNIFICANCE

Class	Route	County	Average Daily Traffic	TSMO Tier	511 Network	Notes and Considerations
Interstates	PENNA TURN-PIKE INTERSTATE 76	Berks Cumberland Dauphin Franklin Lebanon Lancaster York	40K – 51K 24K 30K – 36K 25K 30K 30K – 40K 24K – 30K	1B,1C 1C 1C 1C 1C 1C 1C	Yes	• East-west Pennsylvania Turnpike Commission toll facility connecting New Jersey and Ohio • Significant regional commerce activity
	INTERSTATE 78	Berks Lebanon Lehigh Northampton	34K – 44K 30K – 35K 38K – 88K 53K – 60K	1B 1B 1A,1B 1A	Yes	• East-west interstate connecting Harrisburg with New York City • Serves as a bypass to congested US 22 corridor in Lehigh Valley • Significant regional commerce activity
	INTERSTATE 80	Carbon Luzerne Monroe	20K – 22K 22K – 31K 20K – 60K	1C 1B,1C 1A,1B,1C	Yes	• East-west interstate connecting Northeast (NYC) and Midwest • High percentage of Interstate and inter-regional travelers • Significant commerce activity
	INTERSTATE 81	Cumberland Dauphin Franklin Lackawanna Lebanon Luzerne Schuylkill Susquehanna	38K – 76K 49K – 94K 38K – 49K 24K – 79K 23K – 49K 24K – 67K 24K – 31K 24K	1A,1B 1A,1B 1B 1A,1C 1B,1C 1A,1B,1C 1C 1C	Yes	• North-south interstate running from Tennessee to New York and Ontario • The I-81 Corridor Coalition comprises six states and organizes to handle issues such as truck traffic and air pollution • Significant commerce activity
	INTERSTATE 83	Cumberland Dauphin York	63K 37K – 124K 39K – 66K	1A 1A 1A,1B,1C	Yes	• North-south interstate connecting Baltimore to Harrisburg • Part of the Capital Beltway which surrounds Harrisburg
	INTERSTATE 84	Lackawanna Pike Wayne	23K – 52K 18K – 28K 18K – 23K	1B,1C 1C 1C	Yes	• East-west interstate which begins near Scranton and runs into central Massachusetts, passing through Hartford, Connecticut • Within Pennsylvania, it provides access to Lake Wallenpaupack and other outdoor recreation areas
	INTERSTATE 176	Berks	15K – 21K	1C	Yes	• Spur route of I-76 which runs from the Morgantown interchange on the PA Turnpike to US 422 near Reading

Class	Route	County	Average Daily Traffic	TSMO Tier	511 Network	Notes and Considerations
Interstates		Dauphin	60K – 67K	1A,1B	Yes	• Auxiliary route connecting the Harrisburg East Turnpike interchange north to I-83/US 322 at the Eisenhower Interchange • To the southeast, it continues as PA-283 towards Lancaster as a freeway
		Lackawanna Monroe Wayne	26K – 29K 25K – 27K 26K	1C 1C 1C	Yes	• Spur highway that connects I-80 with I-81 and I-84 • Runs north from I-80 towards Scranton • Tobyhanna Army Depot located at Exit 8
		Carbon Lackawanna Lehigh Luzerne	17K – 30K 8K 30K – 46K 8K – 17K	1C 1C 1C 1C	Yes	• North-south Pennsylvania Turnpike Commission toll facility connecting Philadelphia and Scranton • Significant regional commerce activity
U.S. Routes		Lackawanna Pike Wayne Wyoming	9K – 30K 3K – 17K 6K – 19K 6K – 17K	1C, 2B 2B,3A,3B 3A,3B 2B,2C	Partial	• East-west route spanning the entire state • Major commercial corridor through Wayne and Pike Counties
		Cumberland Dauphin Franklin Lackawanna Luzerne Perry Susquehanna Wyoming	3K – 40K 8K – 19K 6K – 23K 9K – 30K 3K – 25K 8K – 20K 1K – 10K 2K – 6K	1C,2A,2B, 3A,3B 1C 2B,2C,3A 1C,2A,2B 2B,2C,3A, 3B 1C,2A,2B 3B,3C 3B	Partial	• North-south US highway running from Louisiana to New York, connecting to Quebec • Between Maryland and Harrisburg, it generally parallels I-81 • Also parallels I-81 in the Scranton/Wilkes-Barre area
		Adams Cumberland York	18K – 25K 32K – 54K 25K – 32K	1C,2A,2B 1B,1C 2A	Yes	• North-south US highway spanning South Carolina to New York • One of the original US highways • Connects between Maryland and Harrisburg by way of Gettysburg
		Dauphin Lebanon Lehigh Northampton Perry	7K – 57K 7K – 10K 21K – 91K 39K – 83K 16K – 24K	1B,1C,2A, 2B,3A 3A 1A,1B,1C 1A,1B,1C 1C	Yes	• West-east US highway running from Cincinnati, OH to Newark, NJ • One of the original US highways • Between I-78 and Easton, it runs as a limited-access expressway

Class	Route	County	Average Daily Traffic	TSMO Tier	511 Network	Notes and Considerations
U.S. Routes	30	Adams Franklin Lancaster York	6K – 22K 4K – 22K 17K – 108K 14K – 54K	2B,2C 2B,2C 1A,1B,2A 1B,1C,2A, 2B	Partial	• East-west US highway running from Astoria, OR to Atlantic City, NJ • Connects Chambersburg, Gettysburg, York, and Lancaster within the Eastern Region
	209	Carbon Dauphin Monroe Schuylkill	5K-24K 4K-9K 5K-43K 2K-18K	2B,2C,3A, 3B 3A,3B 1C,2B,3A 3A-3B	No	• State highway running from New York to Millersburg • Highway travels the length of the Delaware Water Gap National Recreation Area through the Lehigh Valley and Jim Thorpe
	222	Berks Lancaster Lehigh	21K – 75K 1K – 54K 14K – 26K	1A,1B,1C, 2A 1B,1C,2B, 2C,3A,3B, 3C 2A,2B	Yes	• Spur highway of US 22 running from Maryland to I-78 near Allentown • Principal artery between Lancaster, Reading, and Allentown
	322	Dauphin Lancaster Lebanon	15K – 42K 7K – 21K 7K – 21K	1C,2A,2B 2A,2B,2C 1C,2B,2C	Partial	• East-west highway running from Cleveland to New Jersey • Regionally, it connects Harrisburg to Hershey and Pennsylvania Dutch Country
	422	Berks Dauphin Lebanon	6K – 83K 14K – 22K 6K – 17K	1A,1B,1C, 2A,2B,2C 2B 2B,2C	Partial	• Spur route of US 22 • Regionally, it connects Hershey to Reading and to Pottstown and King of Prussia to the southeast
PA State Routes	33	Monroe Northampton	15K-33K 33K-57K	1C 1B,1C	Yes	• State highway stretching from I-78 to I-80 • Used as HAZMAT bypass for the PA Turnpike's Northeast Extension due to Lehigh Tunnel restrictions • Connects Lehigh Valley to Pocono Mountains region
	61	Berks Schuylkill	7K – 27K 2K – 32K	2A,2B 1C,2A,2B, 2C	No	• State highway running from Reading to Shamokin Dam • Connects Reading to I-78 and I-81 to the north
	283	Dauphin Lancaster	45K – 53K 43K – 59K	1B 1B	Yes	• Freeway which connects Lancaster with I-283 and the Harrisburg area • Parallels PA-230, a former US route, which previously provided the primary connection between these cities

Class	Route	County	Average Daily Traffic	TSMO Tier	511 Network	Notes and Considerations
PA State Routes	309	Carbon Lehigh Luzerne Schuylkill Wyoming	9K 5K – 49K 7K – 66K 5K – 20K 6K – 8K	2C 1B,2A,2B, 2C 1B,1C,2A, 2B,3A 2B,2C 3A	Partial	• State highway running from Philadelphia to north of Wilkes-Barre • Provides an alternate north-south route for Eastern Pennsylvania, roughly parallel to I-476

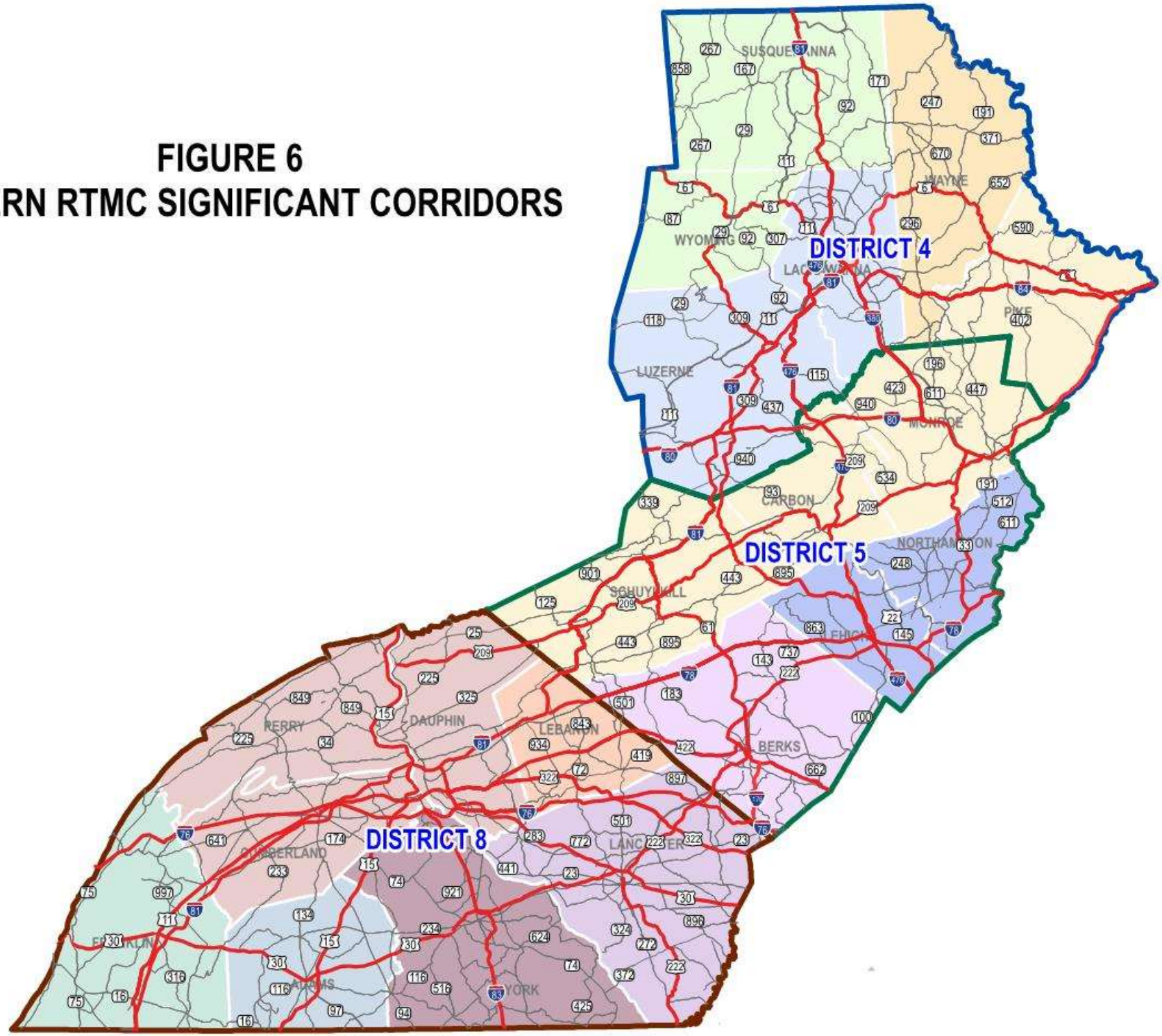
I-81 runs the length of the region, from Maryland to New York, providing a generally north-south backbone and carrying an annual average daily traffic (AADT) of up to 94,000 vehicles. I-80 provides a major east-west route through the northern part of the region and is notable for its particularly heavy truck traffic. I-78 and I-83 are other major interstates in the region, with I-78 connecting the region to New York City and I-83 connecting Harrisburg to Baltimore. PTC's Northeast Extension (I-476) provides another major north-south route connecting Scranton/Wilkes-Barre to the Philadelphia region while their Mainline (I-76) is a major east-west route which through the middle of the region, connecting to Pittsburgh and Ohio in the west and to Philadelphia and New Jersey in the east.

US 22 is a main east/west non-interstate highway through the region. US 22 runs from Cincinnati to Newark, NJ and locally connects the Lehigh Valley cities of Allentown, Bethlehem, and Easton. Another major east/west highway is US 30 which runs across the state and connects Chambersburg, Gettysburg, York, and Lancaster within the region. US 11 generally parallels I-81 across the region and US 222 provides connections between Lancaster, Reading, and Allentown. US 422 provides the main connection from Reading to King of Prussia and the greater Philadelphia area.

Three important PA state routes were identified – PA-33 which runs north-south from I-78 to I-80, PA-61 which connects Reading to I-78 and I-81, and PA-309 which roughly parallels I-476 as a north-south route connecting the Scranton/Wilkes-Barre area to the Philadelphia region via Allentown.

Figure 6 displays a map of the significant corridors in the region.

FIGURE 6
EASTERN RTMC SIGNIFICANT CORRIDORS



Regional TSMO Elements

The Eastern Region has a growing number of ITS devices throughout the districts including Closed-Circuit Television (CCTV) cameras, dynamic message signs (DMS), and road weather information systems (RWIS). The Eastern Regional Traffic Management Center (ERTMC), located at the PennDOT District 8-0 offices in Harrisburg, PA, operates these devices. The ERTMC oversees the operations of the freeway and major arterial system through ITS devices, freeway service patrols, communication with emergency responder agencies, and close coordination with the other PennDOT Districts.

A summary of the PennDOT ITS devices in the region can be found in **Table 11** and a map showing the ITS devices is included as **Figure 7**.

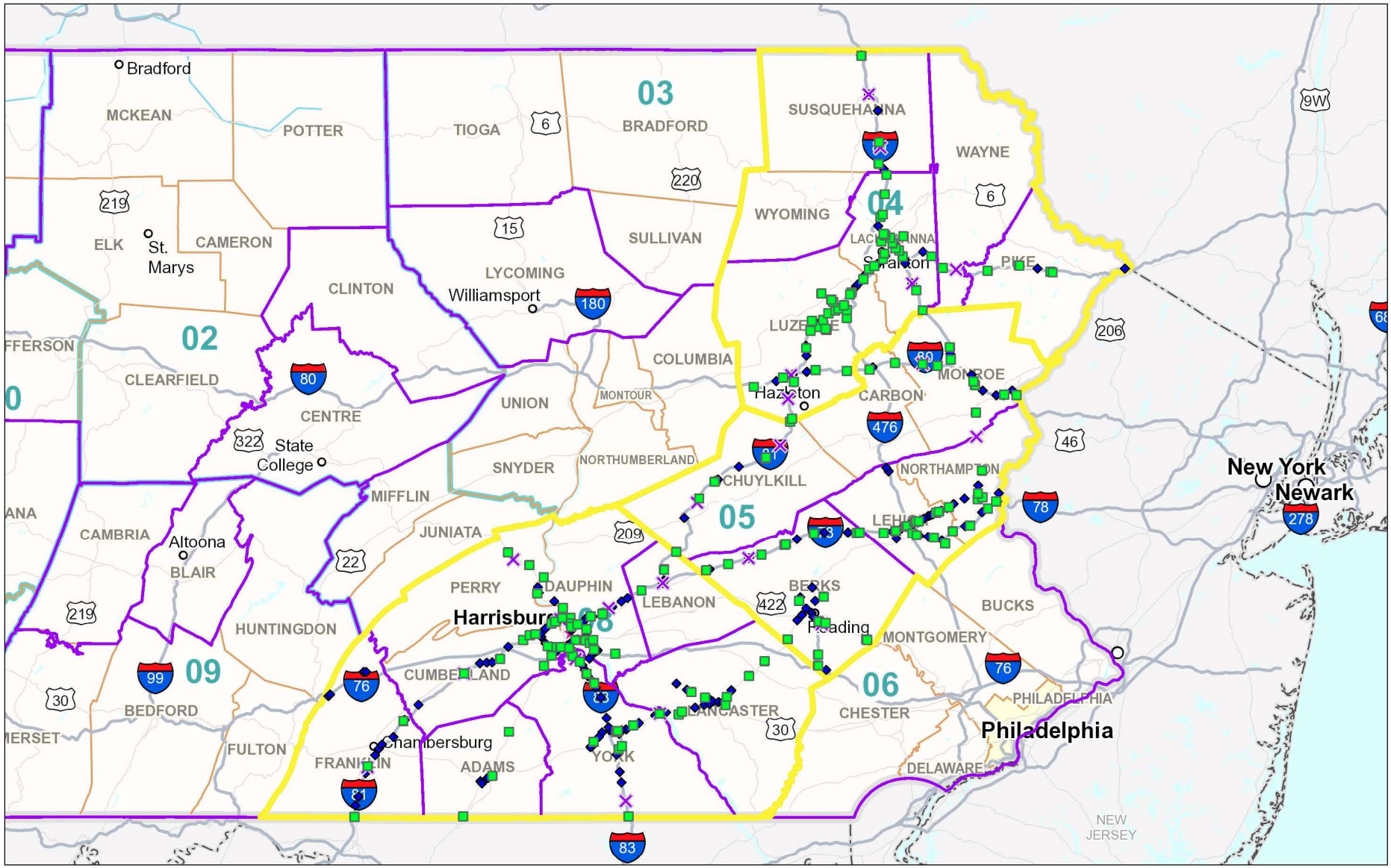
TABLE 11: EASTERN REGION ITS ELEMENTS

ITS Devices	District 4	District 5	District 8	Total
CCTV	33	49	106	193
DMS	55	60	69	192
RWIS	6	6	9	21
Traffic Signals	604	1404	1680	3688

(SOURCE: PENNDOT ONE MAP AND PENNDOT DISTRICTS)

pennsylvania
DEPARTMENT OF TRANSPORTATION

Eastern RTMC ITS Devices



December 3, 2019

- Dynamic Message Signs
- RWIS Stations and Weather
- CCTV Cameras
- TSMO Eastern Region
- Planning Organizations

1:2,431,054

0 20 40 80 mi

0 30 60 120 km

FIGURE 7: EASTERN RTMC REGION ITS DEVICES

Chapter 3. Existing and Future Operations

TSMO Mapping

This section provides information documenting and summarizing the region's existing and future operations performance. Much of this data has been culled from PennDOT One Map, a web-based interactive GIS mapping application (gis.penndot.gov/OneMap). Through this new website, PennDOT has aggregated traffic operations metrics, crash clusters, and many other data from a variety of sources. This powerful tool provides PennDOT and their planning partners with the ability to identify and investigate problem areas in a continuing process, planning for new and changing needs as they develop.

Existing Corridor Performance

Mobility

The Eastern region is a diverse mix of urban, suburban, and rural areas, each with their own unique transportation issues. Urban areas, particularly in the vicinity of Harrisburg and the Lehigh Valley, incur the heaviest recurring congestion, though other notable recurring congestion occurs in areas throughout the rest of the region, particularly at connections between signalized arterials and limited access roadways. Some of the most significant recurring congestion can be found on the following roadways:

- Capital Beltway in Harrisburg, particularly I-83 and I-81
- Arterials in vicinity of Lancaster, particularly US 30, PA-501, and PA-741
- US 222 and US 422 near Reading
- US 22 and I-78 in Lehigh Valley
- I-81 corridor in Scranton/Wilkes-Barre area

Measures of traffic congestion are calculated from third party probe data, which aggregates speed and travel time data from a sampling of vehicles throughout the roadway network. Two distinct measures of congestion are Bottleneck Rankings and TomTom Travel Time Ratios, which have been aggregated in One Map. Bottleneck Rankings are derived from the RITIS PDA Suite based on INRIX probe speed data, with a bottleneck occurring whenever the speed is less than 60% of the estimated free flow speed. These bottlenecks are ranked by delay, which is weighted by volume, queue length, magnitude of speed drop, and duration. This is a valuable piece of data but the following limitations should be kept in mind when analyzing bottleneck data:

- Free flow speeds are determined by INRIX, which in some cases might be based on limited data sets
- Low volume periods may use historical average speeds instead of current speed data when there aren't enough probe vehicles
- Non-NHS roadways do not have volume data in RITIS, so delay cannot be calculated

To augment the bottleneck data, travel time ratio data was also considered, derived from anonymized data pulled from TomTom's navigation devices, in-dash systems, and apps. The travel time ratio compares actual travel times to free-flow travel times. This data is presented as four different tiers of severity within One Map.

The maps provided on the subsequent pages show both the Top 25 Eastern RTMC Region Bottlenecks and the TomTom Travel Time Ratio displayed in some of the region's most congested areas. Note that the maps do not represent the actual distance covered by the bottlenecks, only the length of the segment of road where the bottleneck occurred.

- Harrisburg (**Figure 8**)
- Lancaster (**Figure 9)**
- Lehigh Valley (**Figure 10**)
- Scranton/Wilkes-Barre (**Figure 11**)
- Reading (**Figure 12**)

One of the most effective ways to increase the capacity of these congested roadways is by shifting single-occupant vehicle trips to more efficient modes. The existing multimodal accommodations on these routes vary. The potential for mode change also varies in each area based on land use and density.

Harrisburg

Peak hour recurring congestion in the Harrisburg area is present on the Capital Beltway, particularly I-83 approaching I-81. Commuter traffic mixes with significant long-haul trucking on the I-81 corridor. Arterials such as PA-641 also see recurring congestion during these times. A number of transit services are available for the area. Downtown Harrisburg is served by the Pennsylvanian and Keystone Amtrak lines, with the Keystone line provided relatively frequent service to and from the east. Only one train in each direction runs west of Harrisburg though, greatly limiting potential ridership in that direction. Capital Area Transit provides a largely hub and spoke bus network centered around Downtown Harrisburg with routes running to Carlisle, Mechanicsburg, Middletown, Hershey, and other nearby communities. Lebanon Transit Authority and Rabbittransit also provide largely commuter-focused routes to Harrisburg from other surrounding counties.

Given the dense cluster of jobs located in Downtown Harrisburg, potential exists for higher transit ridership, particularly through use of Park-n-Ride facilities and transit centers. This would reduce the number of vehicular trips and increase efficiency of the roadway network in the most congested areas of the region. Prioritizing transit service through dedicated lanes and technology such as Transit Signal Priority should be considered. More frequent service would also likely be needed in order to achieve notable positive mode change. In addition to transit, the cycling network could also be improved in order to increase this mode. This includes improvements to the Capital Area Greenbelt, which is currently most used for recreation, and on-street bike infrastructure to provide connectivity to the trail system and to popular destinations, thereby allowing the network to be used for dependable and safe transportation.

Lancaster

Recurring congestion in the Lancaster area occurs mostly on signalized arterials in the vicinity of the city. Lancaster County is served by three Amtrak stations, in Elizabethtown, Mount Joy, and the City of Lancaster. Red Rose Transit Authority (a division of South Central Transit Authority) provides bus service, including 17 fixed routes on a hub and spoke system around the City of Lancaster. A limited amount of park-n-ride lots are located around the county. Bike infrastructure is limited in Lancaster County but the Lancaster MPO, along with the City of Lancaster and the Lancaster Inter-Municipal Committee (LIMC), are working together to implement the 2019 Lancaster Active Transportation Plan. One early implementation project was the City of Lancaster's first parking protected bike lane which was installed on Walnut Street. The Lancaster Active Transportation Plan seeks to identify short distance vehicular trips that could be converted to bike, walk, or transit trips to help reduce congestion.

Lehigh Valley

The Lehigh Valley, centered around the cities of Allentown, Bethlehem, and Easton, sees frequent congestion on both its limited-access and arterial roadways. Some of the most severe congestion occurs along US 22, particularly between Allentown and Bethlehem. The region has a notable number of commuters who travel to New York City, Philadelphia, and New Jersey. It is also one of the fastest growing areas in the country for distribution centers and warehousing. Current zoning and land uses, including large residential subdivisions and suburban-style office parks, limit the multimodal opportunities for much of the Valley, but the potential exists for better connectivity between the urban areas of the adjacent cities. Despite being the third largest metropolitan region in the state, no rail service exists. Bus service is provided by LANTA as well as a number of commuter bus services which provide service to New York City, Philadelphia, and other nearby cities. In order to promote mode change and increase transit ridership, reduction of headways and increased reliability (through dedicated bus lanes and other improvements) would be required. Increasing mixed-use development and refocusing job centers to the urban core would also help reduce the heavily personal vehicle-focused commuting practices in the area. A large number of trails, particularly rail trails, have been developed throughout the Lehigh Valley. To increase their use for transportation, in addition to current recreational uses, missing links should be filled, and better on-street facilities should be provided to connect communities and destinations to them.

Scranton/Wilkes-Barre

The Scranton/Wilkes-Barre metropolitan area, also known as the Wyoming Valley, is crisscrossed by a number of interstates, including I-81, I-84, I-380, and I-476. Most recurring congestion is seen on signalized arterials, particularly near major exits from these interstates. I-81 sees congestion between Scranton and Wilkes-Barre at a few different bottlenecks. Special event traffic adds to the daily recurring congestion with Triple A baseball games at PNC Field and concerts at the Toyota Pavilion on Montage Mountain. Scranton is served by the County of Lackawanna Transit System (COLTS) and Wilkes-Barre is served by Luzerne County Transportation Authority. In addition to these bus transit systems, intercity passenger bus service is provided by Fullington Trailways. Separate trail segments along the Susquehanna and Lackawanna Rivers have been developed but need to be connected to each other, and to surrounding communities in order to increase use, particularly for commuting. The Scranton Wilkes-Barre Downtown Bicycle and Pedestrian Study is now underway and anticipated to be completed in mid-2020.

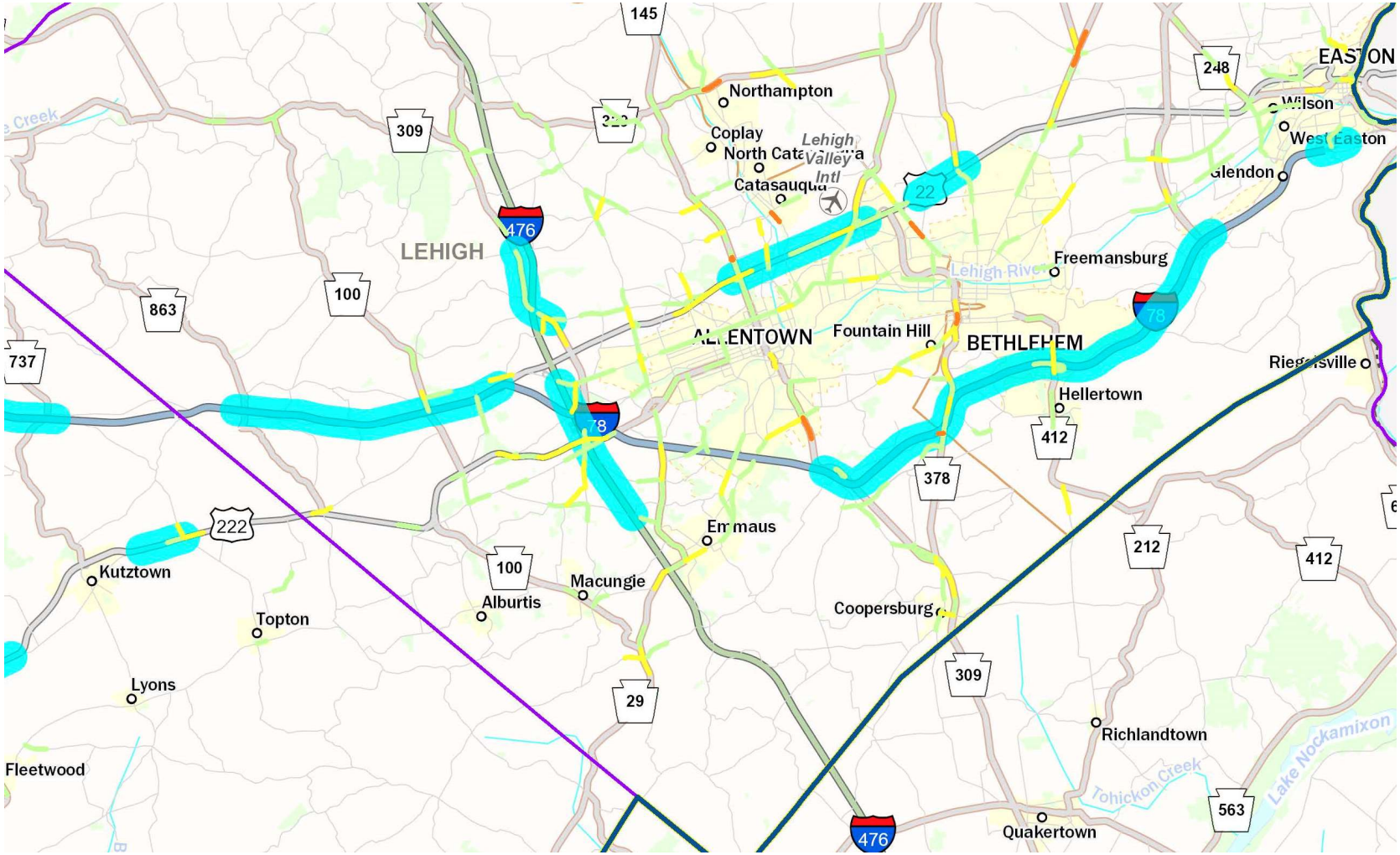
Reading

The City of Reading experiences recurring congestion on signalized downtown streets and on US Routes 222 and 422, among other arterials. Bus service in the area is provided by Berks Area Regional Transportation Authority (BARTA), a part of South Central Transit Authority. Their hub and spoke network provides service to the surrounding communities, particularly to the north, south, and west of the city. Sections of the Schuylkill River Trail have been built in the Reading area, which will eventually provide a completely off-street bike connection to Philadelphia and other destinations in between. In the meantime, more dedicated on-street bike lanes through the City of Reading would be beneficial to provide alternate transportation options through the Downtown area and increased connectivity to the growing trail system.

LEGEND
- TOP 25 BOTTLENECKS
- TRAVEL TIME RATIO > 4
- TRAVEL TIME RATIO 3 - 4
- TRAVEL TIME RATIO 2 - 3
- TRAVEL TIME RATIO 1.5 - 2

FIGURE 8: HARRISBURG CONGESTION MAP

FIGURE 9: LANCASTER CONGESTION MAP



LEGEND
- TOP 25 BOTTLENECKS
- TRAVEL TIME RATIO > 4
- TRAVEL TIME RATIO 3 - 4
- TRAVEL TIME RATIO 2 - 3
- TRAVEL TIME RATIO 1.5 - 2

FIGURE 10: LEHIGH VALLEY CONGESTION MAP

FIGURE 11: SCRANTON/WILKES-BARRE CONGESTION MAP

LEGEND

- TOP 25 BOTTLENECKS
- TRAVEL TIME RATIO > 4
- TRAVEL TIME RATIO 3 - 4
- TRAVEL TIME RATIO 2 - 3
- TRAVEL TIME RATIO 1.5 - 2

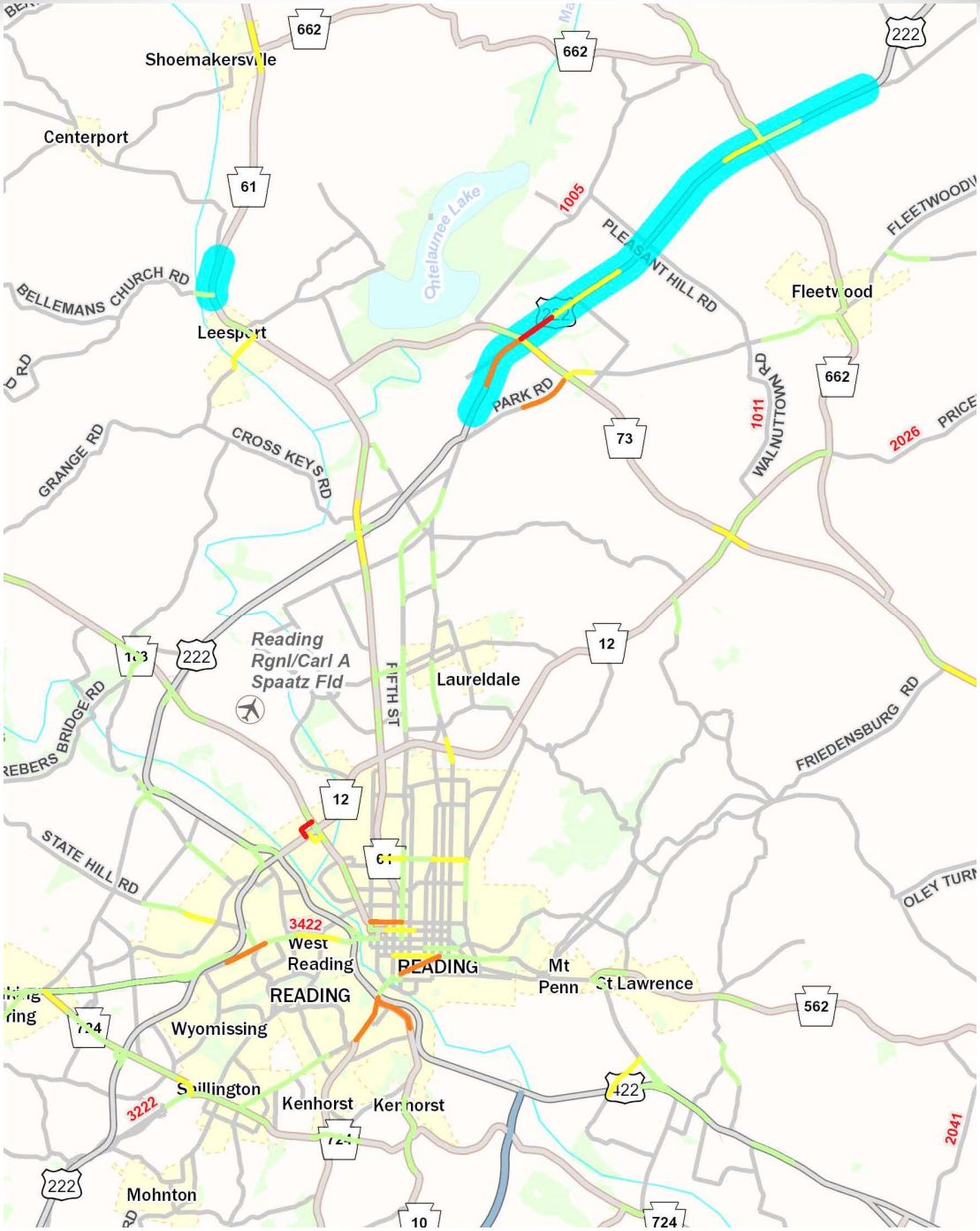


FIGURE 12: READING CONGESTION MAP

Traveler Information and Situational Awareness

While much of the congestion in the urban and suburban areas of the region is recurring in nature, non-recurring congestion due to weather, incidents, and special events also has great impacts on mobility throughout the entirety of the region. In these cases, getting information to the operators in the ERTMC and to the travelers on the roadways is vital to minimize impacts. The ITS device deployment for the region largely focuses on the interstate routes, including I-80, I-81, I-83, and the Pennsylvania Turnpike (I-76 and I-476). A large number of devices are also deployed on US 22 in the Lehigh Valley, US 30 near York and Lancaster, and the non-interstate portions of the Capital Beltway around Harrisburg. Elsewhere in the region, these deployments are more sporadic, so situational awareness is more limited for the ERTMC and other operators and, as a result, it is more difficult to get information to affected travelers.

Recently, truck restrictions have been proactively placed on interstates when winter storms are approaching. This is done to avoid trucks becoming stuck on the interstates and causing dangerous long-term closures and trapped queues. However, many trucks are diverting to arterials and causing operational problems during these events. Crucially, ITS deployments on many of these arterials are rare, so situational awareness of these events is difficult to achieve, and there are not easy ways to distribute traveler information on these routes. Many other trucks are also parking on shoulders and ramps, reflecting a need for more truck parking and better dissemination of truck parking availability to drivers.

A variety of special events produce traffic issues at sites throughout the region, including sports and music events at the stadiums and arenas in the urban areas as well as season and annual events in the surrounding areas. Notable special events in the Eastern RTMC region from a traffic perspective include:

- Car shows in Carlisle
- Farm Show Complex events in Harrisburg
- Concerts and other events at Hersheypark
- Gettysburg National Park events, particularly July-October
- York County Fairgrounds (fair and Street Rod Nationals East car show)
- Musikfest in Bethlehem
- Pocono Raceway in Long Pond (Monroe County)
- Seasonal traffic for ski resorts and other destinations in the Pocono Mountains

Safety

Safety is a primary concern for PennDOT, and operations improvements will not be instituted at the detriment to safety. Crash issues are a concern throughout the region and a frequent cause of congestion. Clusters of curved road crashes are widely spread throughout the region on winding, rural roads as well as on interstates. Rear-end crashes and intersection crashes are noticeable in urbanized areas and along signalized arterial corridors. A few corridors with higher crash activity are:

- City of Harrisburg, Dauphin County

  - I-81, I-83, and PA-230 (Cameron Street)
- City of York, York County
  - I-83, US 30, and PA-74
- City of Lancaster, Lancaster County
  - US 30, US 222, PA-72 (Queen Street), PA-462 (Columbia Avenue), PA-501 (Lititz Pike), and SR 4020 (Harrisburg Avenue)
- Cities of Allentown and Bethlehem, Lehigh/Northampton Counties
  - I-78, US 22, PA-145 (MacArthur Road/7th Street), PA 222 (Hamilton Boulevard/Hamilton Street), SR 1002 (Tilghman Street), and SR 2005 (Lehigh Street)
- Cities of Scranton and Wilkes/Barre, Lackawanna/Luzerne Counties
  - I-81, PA-309, and PA-115
  - Relatively large number of streets within the urban core of both cities

These corridors were identified based on crash data provided through PennDOT One Map. The data is based on source information from CDART, the Crash Data Analysis and Retrieval Tool. This is a web-based query tool that pulls together detailed information on reportable crashes. Reportable crashes are classified as incidents that result in an injury or where at least one of the involved vehicles must be towed from the scene. The latest CDART data (2014-2018) is available in One Map for authorized users.

The list above and maps provided on the following pages provide examples of high crash areas in the region but are not comprehensive. Many other municipalities and corridors have existing crash issues which have been reviewed as part of the ROP process. For example, Berks County has a number of notable crash clusters, both in the City of Reading and on more rural major corridors in the rest of the county. Some of the highest crash rates in Berks County occur on Business Route 222 (5th Street) in Reading and on PA-724 between Sinking Spring and Shillington. Additionally, a number of heavy truck crash clusters occur along I-78 from Hamburg east towards Lehigh County. One Map should be consulted for further crash cluster detail on other areas in the region.

This figure has been redacted pursuant to 75 Pa. C.S. §3754 and 23 U.S.C. §409

FIGURE 13: HARRISBURG CRASH CLUSTERS AND HIGH CRASH RATE AREAS

IMPORTANT: This traffic engineering and safety study is confidential pursuant to 75 Pa. C.S. §3754 and 23 U.S.C. §409 and may not be disclosed or used in litigation without written permission from PennDOT.

This figure has been redacted pursuant to 75 Pa. C.S. §3754 and 23 U.S.C. §409

FIGURE 14: YORK CRASH CLUSTERS AND HIGH CRASH RATE AREAS

IMPORTANT: This traffic engineering and safety study is confidential pursuant to 75 Pa. C.S. §3754 and 23 U.S.C. §409 and may not be disclosed or used in litigation without written permission from PennDOT.

This figure has been redacted pursuant to 75 Pa. C.S. §3754 and 23 U.S.C. §409

FIGURE 15: LANCASTER CRASH CLUSTERS AND HIGH CRASH RATE AREAS

IMPORTANT: This traffic engineering and safety study is confidential pursuant to 75 Pa. C.S. §3754 and 23 U.S.C. §409 and may not be disclosed or used in litigation without written permission from PennDOT.

This figure has been redacted pursuant to 75 Pa. C.S. §3754 and 23 U.S.C. §409

FIGURE 16: LEHIGH VALLEY CRASH CLUSTERS AND HIGH CRASH RATE AREAS

IMPORTANT: This traffic engineering and safety study is confidential pursuant to 75 Pa. C.S. §3754 and 23 U.S.C. §409 and may not be disclosed or used in litigation without written permission from PennDOT.

This figure has been redacted pursuant to 75 Pa. C.S. §3754 and 23 U.S.C. §409

FIGURE 17: SCRANTON/WILKES-BARRE CRASH CLUSTERS AND HIGH CRASH RATE AREAS

IMPORTANT: This traffic engineering and safety study is confidential pursuant to 75 Pa. C.S. §3754 and 23 U.S.C. §409 and may not be disclosed or used in litigation without written permission from PennDOT.

Organizational Issues

Maintenance of existing ITS elements is vital to the success of the ERTMC and the ITS system throughout the region. This includes performing routine inspections, fixing problems in a timely manner when they do arise, and ensuring that devices are replaced as they approach the end of their lifecycles.

Training in the operation of ITS equipment is also important. RTMC personnel receive training to operate and gather data from the various ITS devices at their disposal and maintenance personnel should also be familiar with the devices so that they can monitor and diagnose problems in the field.

Diagnosing Congestion Sources

In 2005, FHWA published the original "congestion pie charts," which provided visual representation of the suspected causes of congestion for rural and urban areas. These charts showed that non-recurring congestion such as traffic incidents and inclement weather account for the large majority of rural congestion, while the largest portion of urban congestion is caused by bottlenecks.

Recently, PennDOT's Traffic Systems and Performance Unit set out to create Pennsylvania-specific pie charts for the different regions, districts, and corridors throughout the state. The goal of the effort is to enhance TSMO congestion management strategies. The various causes of congestion (and their sources/definitions), as determined by PennDOT, are as follows:

- Roadwork: RCRS Roadwork, Maintenance Database, or Waze Roadwork event
- Weather: Inclement weather conditions from RWIS or Waze weather event
- Recurring: Congestion where speed drop is no more than 10% greater than the historical average speed
- Minor Crash: Non-reportable crash from RCRS or Waze
- Other Incident: Non-crash traffic hazard from Waze (i.e. disabled/car stopped on shoulder, hazard on roadway)
- Crash: Reportable crash from the Crash Record System (CRS)
- Unknown: cause could not be identified with current data sources
- Rubbernecking: any previously identified congestion pie chart incident cause is linked to one side of the road, and no incident is correlated to the other side of the road in the same area, but still experiences a speed drop above historical norm

Figure 18 – **Figure 21** show congestion pie charts for each District, as well as the Eastern Region as a whole. These charts were developed from 2019 traffic data. Data was limited to PennDOT's Core Roadway Network, which is predominantly limited-access, though there are limited signalized areas. There were issues with January and February data, so weather-related congestion is likely underrepresented in the charts. While the specific percentages change for each area, the overall trend shows that roadwork is the overwhelmingly most frequent cause of congestion. Weather, crashes, and other incidents also cause notable amounts of congestion. It is important to note that recurring congestion is very minimal throughout each District.

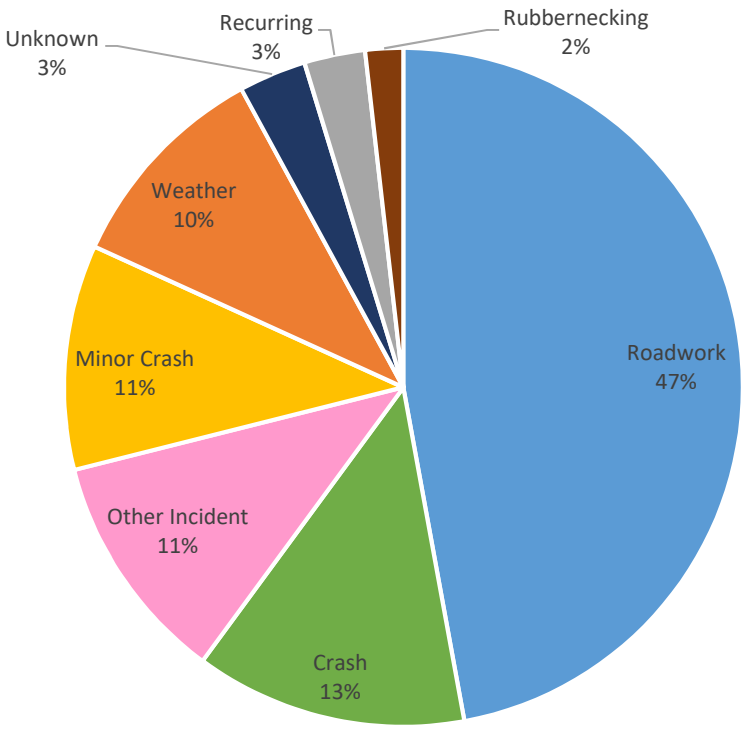


FIGURE 18: 2019 CONGESTION PIE CHART – EASTERN REGION

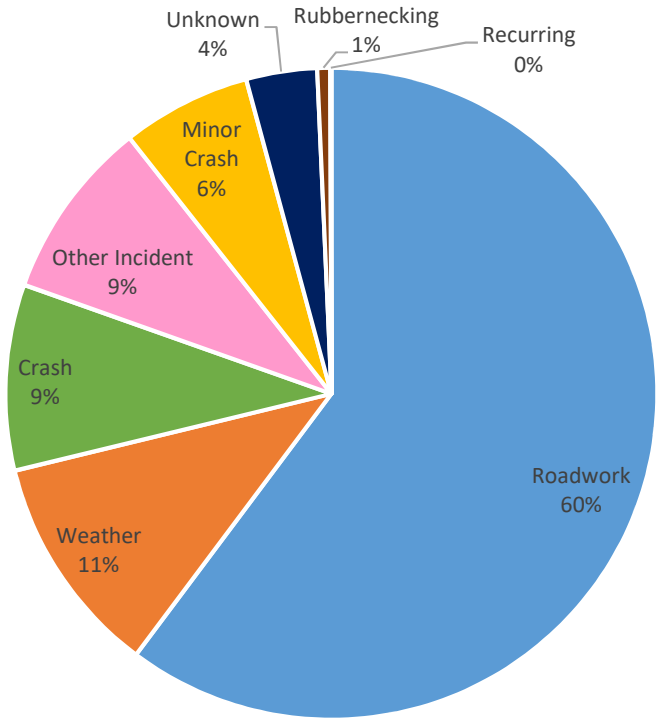


FIGURE 19: 2019 CONGESTION PIE CHART – DISTRICT 4

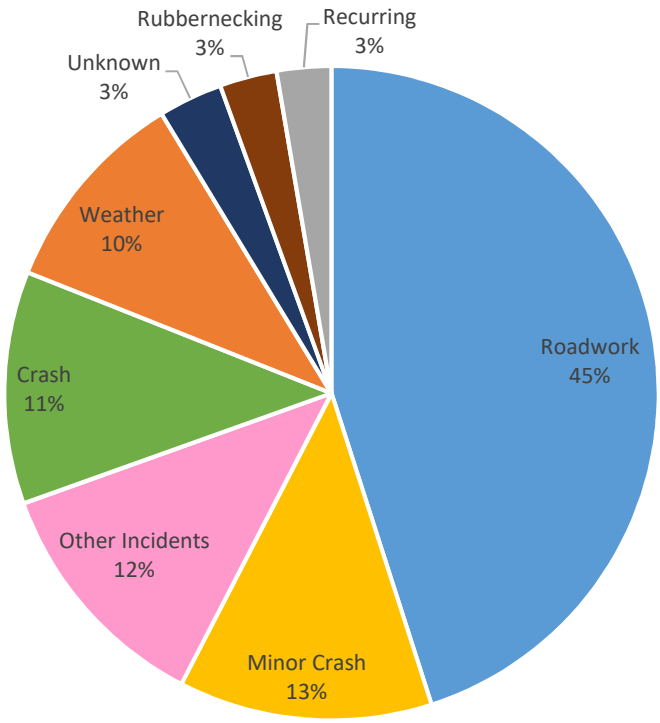


FIGURE 20: 2019 CONGESTION PIE CHART – DISTRICT 5

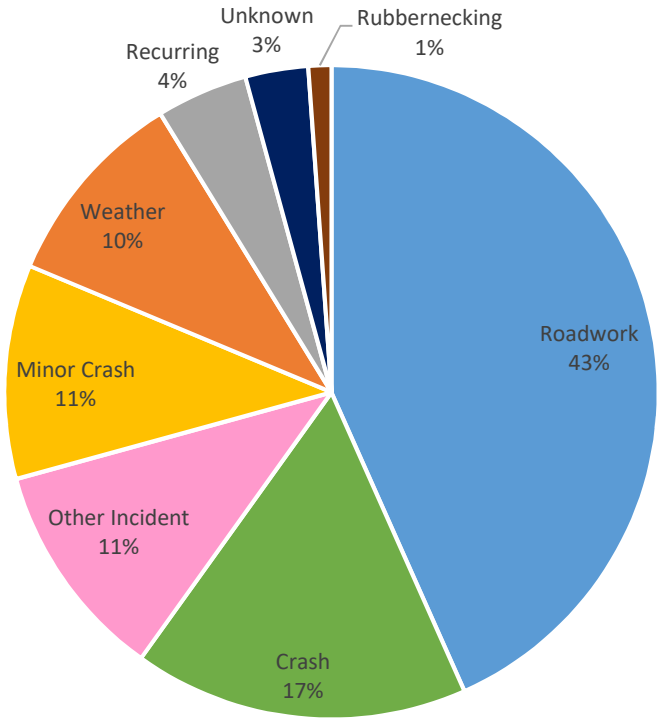


FIGURE 21: 2019 CONGESTION PIE CHART – DISTRICT 8

Recently Completed Projects

Within the ERTMC region, a number of interstate and other roadway projects have been completed recently. Additionally, multiple interconnected and adaptive traffic signal systems and ITS equipment installations have been completed as well.

Highway Projects

US 22, Section 400 (Lehigh County) was a multi-year project that was completed in Fall 2019. It included the reconstruction of the US 22/Fullerton Avenue interchange and major rehabilitation of the US 22 Lehigh River Bridge to improve safety and prepare for the possible widening of US 22 to six lanes in the future.

I-78, Section AUX (Lehigh County) included reconstruction and addition of auxiliary lanes on I-78 between the merge with US 22 and the PA-145 interchange.

SR 0441, Section 012 (Lancaster County) provided a new alignment for PA-441 through the Borough of Columbia, reducing traffic congestion and improving vehicular and pedestrian safety. The project also reduced noise and improved air quality through the downtown commercial and historic districts.

Traffic Signal Projects

SR 1009, Section 01S (Lehigh/Northampton Counties) was completed in 2018. This corridor project along Schoenersville Road included new signal timing plans, updated signal hardware, and an upgrade in signal interconnection to the closed loop traffic responsive system.

SR 0072, Section 034 (Lancaster County) was also completed in 2018. This project included intersection and traffic signal improvements along Manheim Pike from SR 4011 (Fruitville Pike) to SR 4013 (Graystone Road). The project limits ran from the City of Lancaster to East Petersburg Township.

The **Lancaster TSM Corr 7-12** (Lancaster County) project was a congestion reduction project completed in 2017, including coordination and management improvements on various corridors in Lancaster County, including SR 4011 (Fruitville Pike), PA-272 (Oregon Pike), and SR 1063 (New Holland Pike).

Many **Adaptive Signal Projects** have been completed over the last few years to improve traffic operations on corridors throughout the region. Recent adaptive signal projects include US 15, US 30, and PA-74 in York County, US 11 in Cumberland County, and US 22 in Dauphin County.

ITS Projects

Completed in 2019, **Reading ITS Expansion** (Berks County) added CCTV cameras, DMS, Highway Advisory Radio (HAR), and Freeway Service Patrols to Reading along US 222, US 422, and PA-12. The project also included the addition of one full-time equivalent staff member to the District 5 TMC.

The **ITS – Lancaster Phase 2** (Lancaster County) project included installation of ITS equipment along US 30 and PA-283 in Lancaster County.

Planned Infrastructure Changes

The following provides a list of some of the currently planned infrastructure changes throughout the region that could have a notable impact on traffic operations. This includes both the potential issues faced during construction as well as the hopeful traffic improvements once the projects are completed.

- SR 0424, Section 390 (Luzerne County) – includes extension of SR 0424 (Hazelton Beltway) west of I-81 to connect with SR 0924 to improve operations of growing distribution hub.
- I-81 Reconstruction (Luzerne County) – includes 4.5 miles of reconstruction, widening, and interchange reconfiguration along I-81 near Wilkes-Barre. This project was let as a Public-Private Partnership (P3) effort and is currently in design.
- Scranton Beltway (Lackawanna and Luzerne Counties) – The Pennsylvania Turnpike Commission is developing plans to provide high-speed interchanges between I-81 and the Northeast Extension (I-476) in the Scranton area. The interchanges would be at Clarks Summit and Pittston and provide an easier parallel route to avoid I-81 and Scranton congestion.
- I-80 Reconstruction (Monroe County) – includes 3.5 miles of full roadway reconstruction, widening, and interchange reconfiguration in Eastern Monroe County. The project limits run from west of the Exit 303 interchange to east of Exit 306.
- US 222 Improvements (Berks County) – a number of projects active and programmed along this corridor, including plans to reconstruct and widen the two-lane segments of US 222 to four-lane cross sections between Reading and the Kutztown Bypass, as well as a planned improvement to the interchange between US 222/422 and PA-12 near Reading. A long-range project will look at widening US 222 from the Kutztown Bypass to the Lehigh County line or to the Trexlertown Bypass.
- I-78 Improvements (Berks/Lehigh/Northampton Counties) – a number of projects are planned along the I-78 corridor, including widening at the PA-61 Hamburg interchange, reconstruction and addition of truck climbing lanes around the Krumsville interchange, and a potential new interchange at Adams Road, just west of Route 100.
- US 22 Widening (Lehigh County) – Currently in design to widen US 22 to six lanes from 15th St to Airport Rd. Further funding for the project has been shifted to interstate projects but this remains a major potential project for the region.
- SR 0309, Section 12M (Lehigh County) – reconstruction/upgrade of the PA-309/SR 1002 (Tilghman St) interchange. This also includes replacement/rehabilitation of US 22 bridge over PA-309.
- SR 0309, Section 19M (Lehigh County) – interchange improvements to the 309 Center Valley interchange to address current and future planned development in Upper Saucon Township, existing signalized intersection might be converted into full-direction grade-separated interchange.
- SR 0022, Section ITS (Lehigh/Northampton Counties) – addition of DMS and CCTV in the Lehigh Valley to close device gaps.
- SR 0422, Section 29M (Berks County) – highway reconstruction/widening of US 422 (West Shore Bypass) from PA-12 to US 422 Business, including widening to 3 lanes in each direction between Warren St Bypass and I-176 interchange.
- I-83 Capital Beltway projects (Cumberland/Dauphin Counties) – A series of major projects around Harrisburg currently in design with East Shore Section 1 currently in construction.
- I-81 Improvement Strategy (Franklin/Cumberland/Dauphin/Lebanon Counties) – current planning study evaluating 100 miles of I-81 from the MD state line through Lebanon County, identifying needs on the interstate and on connecting roads and infrastructure affected by I-81. This study will include recommendations for ITS deployments along corridor.

- I-83 North York Widening project (Exit 19-22) (York County) – construction planned for 2021-2026, widening to 6 lanes and reconstructing 3 interchanges.
- I-83 Exit 4/PA-851 Interchange (York County) – construction of diverging diamond interchange in Shrewsbury and Hopewell Townships. In construction, expected completion by 2021.
- Veterans Memorial Bridge (York/Lancaster Counties) – rehabilitation of SR 0462 bridge over Susquehanna River. Major traffic impacts due to it being part of alternate route for US 30 incidents. Next bridge crossing is 40 miles south
- US 222/US 30 Interchange (Lancaster County) – interchange improvements and widening US 222 to six lanes near the City of Lancaster
- US 222/US 322 Interchange (Lancaster County) – construction of Diverging Diamond Interchange in Ephrata and West Earl Townships. In construction, expected completed by May 2022.

TSMO Capital Funding Initiative

The TSMO Capital Funding Initiative was introduced in 2018 with the first project awards announced in 2019. This program provides a funding source for TSMO-related projects, including replacement of antiquated ITS devices, new ITS devices, communications system upgrades, and other TSMO efforts. The second round of funding was announced in 2020, including 31 projects statewide totaling $10 million. The ten awarded projects in the Eastern RTMC Region can be found in **Table 12**.

TABLE 12: TSMO FUNDING INITIATIVE FFY 2021 PROJECTS

Planning Partner	District	Description	Category
NEPA	5	Move Existing Message Board	Antiquated Devices
NEPA	5	Upgrade Analog CCTVs to Digital	Antiquated Devices
Lehigh Valley	5	22-LUI	New Devices
Lehigh Valley	5	Lehigh Valley Freeway Service Patrol	TSMO Solutions/PennDOT Connects
Reading	5	RATS Freeway Service Patrol	TSMO Solutions/PennDOT Connects
Adams	8	Adams County Devices	New Devices
Harrisburg	8	PA 283 Gaps	New Devices
Harrisburg	8	US 15 and PA 581 Gaps	New Devices
Harrisburg	8	Interstate Antiquated DMS	Antiquated Devices
York	8	US 30 Camera Gaps	New Devices

Due to an increase in applications, a number of projects were not funded but were placed on waitlist for consideration in the future. **Table 13** shows the Eastern Region projects on the waitlist.

TABLE 13: TSMO FUNDING INITIATIVE FFY 2021 WAITLIST

Planning Partner	District	Description	Category
York	8	Dillsburg Devices	New Devices
Harrisburg	8	Advanced Mobility Plan	Connected/Autonomous Vehicles
Harrisburg	8	Traffic Incident Management Implementation	TSMO Solutions/PennDOT Connects

Planning Partner	District	Description	Category
Harrisburg	8	Dauphin PA-283 ITS Fiber Interconnect	Communications
Harrisburg	8	US 22/322 Devices	New Devices
Harrisburg	8	Dauphin I-283 ITS Fiber Interconnect	Communications
Harrisburg	8	Interstate DMS Gaps	New Devices
Harrisburg	8	US 11 Devices	New Devices
Harrisburg	8	Interstate CCTV Gaps	New Devices
Harrisburg	8	Interstate CCTV DMS Gaps	New Devices

Future Land Use Changes

Warehousing

The most discussed land use topic in the region is the continued proliferation of warehousing, logistics, and distribution centers. Their impact is seen throughout the region, but particularly along the I-81 corridor and in the Lehigh Valley. Some of the notable planned sites include:

- Large warehouse development planned on PA-247 near the US 6 interchange in Jessup.
- Major warehouse recently completed in Philipsburg, New Jersey which is starting to acquire tenants. As this development gets closer to capacity, increased truck traffic will be likely along I-78 and US 22.
- FedEx development near Lehigh Valley International Airport in Allen and Hanover Townships.
- UPS Hub on North Union Street in Middletown.
- Amazon "super hub" development near Harrisburg International Airport. They will also be building major distribution centers in Carlisle and the Lehigh Valley by the end of 2020.
- Warehouses under construction and planned in Berks County, both along the I-78 and PA-61 corridors, as well as closer to the Reading Urban Area.

Mixed-Use Development and Density

A notable mixed-use development is currently planned at the former Mosier Farms site in Middle Smithfield Township. The project, called Smithfield Gateway, would include residential, commercial, and office development. It would be located at the intersection of US 209 and PA-447 near I-80 Exit 309. The project is anticipated to include the widening of US 209 to five lanes.

Two other notable mixed-use developments are the Reading Hospital project on Broadcasting Road near US 222, which will also include office and retail development, and the Pocono Medical Center project on PA-715, which will also include retail, a hotel, restaurants, and other development.

Mixed-Use development and increasing density have the potential to provide substantial congestion reduction by changing the way people travel. More efficient land use policies reduce Vehicle Miles Traveled and open up possibilities for increased mode shift to more sustainable modes such as walking, biking, and transit. In addition to congestion reduction benefits, this also serves to provide reduced environmental impacts and improved health benefits. There are also economic benefits for both governments and the public. Increased density allows for greater tax base while reduction or elimination of parking minimums reduces housing costs.

Chapter 4. Transportation Needs and Operational Issues

Through evaluation of data and stakeholder engagement, the transportation needs and operational issues of the Eastern RTMC Region were identified. These issues and needs have been organized into the following six categories:

- Freeway and Arterial Operations
- Traffic Incident Management
- Traveler Information
- Communications Network
- Multimodal Connectivity
- Operational Teamwork/Institutional Coordination

Tables in the following sections outline the specific transportation needs and operational issues throughout the region for each of the above categories.

Freeway and Arterial Operations

Freeways and arterials act as the backbone of the roadway network, transporting the majority of people and goods within and through the region. Reducing congestion and improving traffic flow along these routes is essential to facilitate the region's economic development. A number of TSMO-related strategies are available to improve operations on these important roadways, maximizing throughput and improving the flow of traffic.

Traffic Signal Improvements

Traffic signals can improve the safety and efficiency of roadway networks for motorists, as well as for transit, cyclists, and pedestrians. However, poor signal timing and/or poor coordination between signalized intersections can negatively impact traffic flow and the effectiveness of the signals.

An important funding mechanism for traffic signal improvements is PennDOT's Green Light-Go. This is a municipal signal partnership program that provides state funds for operational improvements and equipment upgrades at signalized intersections along designated critical corridors of state highways.

Traffic signal funding is also provided by the Automated Red Light Enforcement (ARLE) program, established by Pennsylvania state legislature in 2002. Camera technology is used to monitor and automatically enforce red light running at signalized intersections. The net revenue of this program is then utilized for a state-administered competitive grant program focused on safety improvements, particularly at signalized intersections. Currently, ARLE technology is only installed at a relatively small number of intersections in the Philadelphia area.

Through these funding sources and others, a number of traffic signal improvements can be implemented that provide improvements to traffic flow without roadway widening or other costly improvements.

- Optimization and coordination of signal timing
- Integrating signal systems across adjacent jurisdictions to improve arterial progression

- Adaptive traffic signal control to smoothly adjust timings to account for actual traffic volumes where volumes are less predictable
- Traffic responsive operations for corridors where traffic volumes fall into typical patterns, but the volumes vary daily
- The statewide unified command and control platform allows RTMC operators to remotely alter signal timings during periods of increased demand via fiber optic cable or other network infrastructure.
- Automated Traffic Signal Performance Measures (ATSPMs) use data from traffic signal controllers to analyze and optimize the performance of traffic signals. ATSPMs can reduce the need for manual data collection, increasing the ease and efficiency of deploying improved traffic signal timing.
- Emergency vehicle preemption to halt general traffic movements so that emergency vehicles may pass through
- Removal of unwarranted traffic signals
- Monitoring traffic signals using automated traffic signal performance measures developed from high resolution data logs
- Transit Signal Priority (TSP), which provides special treatment to transit vehicles at signalized intersections

Traffic signals in Pennsylvania are currently owned by each individual municipality. This can create issues when operations and maintenance of signals varies along the same corridor that might run through a number of different municipalities. To combat this problem, PennDOT is currently planning to pilot state ownership of a small number of corridors where they could unify signal systems and provide consistent operations and maintenance. The initial project in this effort consists of PennDOT taking ownership of over 150 traffic signals on parallel arterials to I-76 from Montgomery County to Philadelphia.

Some of the corridors identified as needing signal improvements or other initiatives are shown in **Table 14**: Traffic Signal Improvement Needs.

TABLE 14: TRAFFIC SIGNAL IMPROVEMENT NEEDS

PennDOT District	Arterial	Location	Improvements Needed
4	PA-924 (Can Do Expy.)	I-81 Ramps, near Hazleton	Ramp preemption
4	PA-309 (Church St.)	Hazleton	Retiming, coordination
4	PA-309 (Mountain Blvd.)	Mountain Top	Retiming, coordination
4	Pennsylvania Ave., Wilkes-Barre Blvd.	Wilkes-Barre	Equipment upgrades, retiming, coordination
4	US 11/PA-315	Wilkes-Barre/Scranton	Command/control
4	Scranton CBD	Scranton CBD	Retiming
4	SR 3016 (Davis St.)	Scranton	ATSPM
5	PA-183	Cressona	Equipment upgrades, retiming

PennDOT District	Arterial	Location	Improvements Needed
5	SR 2002 (Delaware Ave.)	Palmerton	Equipment upgrades, retiming
5	PA-940	Carbon/Monroe Counties	Command/control
5	Downtown Corridors	Reading	Equipment upgrades, retiming, ATSPM, Transit Signal Priority
5	PA-73 (Philadelphia Ave.)	Boyertown	Equipment upgrades, retiming
5	US 422	Wernersville/Wyomissing	Equipment upgrades, retiming
5	PA-100	Upper Macungie Twp.	Command/control, ATSPM
5	US 222	PA-100 to Cedar Crest Blvd.	Command/control, ATSPM
5	SR 1002 (Tilghman St.)	Allentown	Command/control, ATSPM
5	PA-329	PA-145 to PA-987	ATSPM
5	SR 2002 (Emmaus Ave.)	Emmaus	Equipment upgrades, retiming
5	SR 2020 (Easton Ave.)	Bethlehem	Upgrade communications
5	PA-378, Hill to Hill Bridge	Bethlehem	Command/control, ATSPM
5	PA-191 (Linden St./Nazareth Pk.)	Bethlehem	ATSPM
5	PA-412	Hellertown, near I-78	Command/control, ATSPM
5	PA-248 (Northampton St.), 3rd St.	Downtown Easton	ATSPM, Transit Signal Priority
5	SR 2025 (Sullivan Trail)	Forks Township	ATSPM
5	PA-309	Tamaqua	ATSPM
8	PA-230 (Cameron St.)	Harrisburg	Command/control, coordination, ATSPM, fiber
8	US 11	Carlisle	Improve detection, command/control
8	US 11/15 & PA-850	Marysville	Command/control
8	I-283/PA-283 Ramps	Highspire	Command/control
8	US 322 (Governor Rd.)	Derry Township	Command/control
8	PA-16 (Main St.)	Waynesboro	Equipment upgrades, retiming
8	US 30	Gettysburg	Command/control, ATSPM
8	US 15	Dillsburg	Command/control, ATSPM
8	US 30	York	Command/control, consider non-adaptive during peaks
8	SR 4009 (Dillerville Rd.)	Lancaster	Convert left turns to flashing yellow arrow
8	US 30, PA-283	Lancaster	Command/control
8	PA-230/PA-241/PA-743	Elizabethtown	ATSPM, flashing yellow arrow for NBL at PA-743/PA-283 Ramps intersection
8	PA-230	Mt Joy	Command/control, ATSPM
8	PA-741	East Hempfield Twp	Upgrade timers, command/control
8	PA-72 (Manheim Pk.)	Lancaster County	Command/control, ATSPM

PennDOT District	Arterial	Location	Improvements Needed
8	PA-501	Lititz	Command/control, ATSPM
8	SR 1063 (New Holland Ave.)	Lancaster	Command/control
8	SR 4011 (Fruitville Pk.)	Lancaster	ATSPM
8	US 422	Lebanon	Full upgrades

Variable Speed Limits

Variable speed limits, also known as variable speed displays, are posted by variable message speed limit signs. These speed limits can be changed remotely by a traffic management center or automatically in response to congestion, incidents, work zones, or road weather conditions. Variable speed displays may be used to slow vehicles before they enter an area of slow-moving traffic to reduce rear-end collisions and maintain traffic flow.

The following corridors were noted for potential variable speed limit deployments:

- US 22, Lehigh Valley (District 5-0)
- I-78, Lehigh Valley (District 5-0)
- I-80, Monroe County (District 5-0)

Queue Detection

Queue warning systems alert drivers to downstream slow-moving traffic, especially in cases where the congestion would be unexpected. Queue warnings are typically delivered to motorists through DMS, though some advanced ITS applications involve in-vehicle queue warnings. Queue warning systems can be used in conjunction with portable DMS ahead of work zones with lane closures in effect or other temporary conditions which will cause atypical congestion. Queue warning systems can also be paired with variable speed limits to improve their effectiveness.

- I-81, Wilkes-Barre/Scranton (District 4-0)
- US 22, Lehigh Valley (District 5-0)
- I-78, Lehigh Valley (District 5-0)
- US 30, from PA-462 to PA-283, Lancaster (District 8-0)
- I-81, US 22/322 to I-78 (District 8-0)
- I-83, Lewisberry Road to PA-581 (District 8-0)

Ramp Metering

Ramp metering requires vehicles to stop at a signal on the freeway ramp before continuing onto the freeway. Typically, the meter allows one vehicle to pass per green light. Ramp metering reduces the merge conflicts that occur when platoons of vehicles enter the freeway, decreasing the impacts of those vehicles on mainline traffic flow. Adaptive ramp meters adjust ramp flow on the basis of real-time freeway congestion and capacity—as well as arterial back-up from the ramp, in some cases—while fixed ramp meters work on a pre-set interval between green signals.

Some of the ramps and corridors identified for potential ramp metering were:

- I-81 On-Ramps from River Street, Scranton (District 4-0)
- I-80, East Stroudsburg (District 5-0)
- US 30 Westbound On-Ramp from Greenfield Road, Lancaster (District 8-0)
- US 22/322, PA-39 and PA-443 Westbound On-Ramps (District 8-0)

Flex Lanes

Flex lanes change the use of space within a corridor to accommodate changing travel demand at various times of the day. A number of methods can be used including reversible lanes and contraflow lanes. The discussion in the Eastern RTMC Region focused on part-time shoulder use, or hard shoulder running, which converts roadway shoulders to travel lanes during specified hours of the day to increase capacity.

To manage these types of flex lanes, ITS systems need to be installed, including automatic data collection (traffic volume sensors) and lane assignment gantries. Extensive coordination is also required to ensure that incident response isn't negatively impacted as well as enforcement so that the shoulders are only in use when allowed.

One particular area was discussed as a potential site for flex lane deployments. I-78 between Exits 67 and 71 in District 5-0 was noted for having recurring congestion related to truck-climbing issues which could be aided by additional capacity during peak times.

Junction Control

Junction Control regulates or closes specific lanes on a freeway mainline upstream of an interchange where high traffic volumes are present and the relative demand on the mainline and ramps changes throughout the day with different peak times. Junction Control is most effective for facilities with underutilized capacity on the mainline lanes upstream of the interchange. Junction Control can also be used to provide a two-lane ramp with the left lane merging into the outside lane of the freeway. As an alternative, an additional on-ramp lane can be extended using the shoulder lane. One Junction Control need was identified in the region at the I-80/I-380 interchange in Monroe County.

Integrated Corridor Management

Integrated Corridor Management (ICM) is a strategy to improve the movement of people and goods through institutional collaboration and integration of existing infrastructure along major corridors. Transportation corridors often contain underutilized capacity such as parallel roadways, unoccupied seats in vehicles, and parallel transit services which could be leveraged to maximize person throughput and reduce congestion.

Currently, an ICM pilot project is underway on the Schuylkill Expressway portion of I-76 that runs from Montgomery County into the City of Philadelphia. This capacity-limited interstate section is an excellent testbed for a number of ICM strategies. A system of variable speed limit signs and a queue detection and warning system are now under construction. Other expected improvements include dynamic junction control, flex lanes, and ramp metering on I-76. PennDOT is also planning to take ownership of traffic signals along parallel corridors in order to manage signal timings and improve flow when traffic diverts from the interstate. Meanwhile, other planned pursuits include increasing frequency of transit on parallel Regional Rail routes and making improvements to the Schuylkill River Trail to encourage cycling.

These types of ICM improvements could be very beneficial on a number of corridors throughout the region, including:

- I-81 Corridor, Wilkes-Barre/Scranton (District 4-0)
- US 22/I-78 Corridors, Lehigh Valley (District 5-0)
- I-81 Corridor, Maryland border to I-78 (District 8-0)
- US 30 Corridor, York to Lancaster (District 8-0)
- I-78 Corridor, Lebanon County (District 8-0)

Traffic Incident Management

The ability to detect, verify, and respond to incidents throughout the regional transportation system is vital to maintain operations and minimize the impact of incidents. The central objective of traffic incident management is to improve the safety of emergency responders, crash victims, and other motorists. Additionally, good Traffic Incident Management reduces the duration and impacts of traffic incidents. Improved management of incidents can improve safety as well as mobility.

TIM Teams

Traffic Incident Management (TIM) is a multi-agency, coordinated effort to minimize the impact of traffic incidents so that traffic flow can be restored as safely and quickly as possible. TIM requires planning and coordination between multiple entities, including local transportation departments, law enforcement, fire departments, emergency medical services, towing and recovery companies, and hazardous materials clean-up contractors. Each entity has its own diverse priorities and cultures that need to be addressed through a unified set of TIM strategies to better interagency coordination and training. A successful TIM Team can lead to reduced incident response cost, decreased travel delay, and improved safety through faster, better organized incident clearance.

Pennsylvania Traffic Incident Management Enhancement (PennTIME) was organized in 2017 as a statewide organization to provide structure, guidance, and consistency to incident management efforts throughout the commonwealth. More information can be found at www.penntime.org.

The ERTMC region currently has three active TIM teams, all in District 8. These teams are Harrisburg Beltway East, Harrisburg Beltway West, and Lebanon County. The following provides a list of further TIM needs in the region:

- I-81 Corridor, Wilkes-Barre/Scranton (District 4-0)
- US 22/I-78 Corridors, Lehigh Valley (District 5-0)
- Reading Area (District 5-0)
- US 30 Corridor and I-83, Franklin/Adams/York/Lancaster (District 8-0)

Freeway Service Patrols

Freeway Service Patrols (FSP) involve roving tow trucks systematically patrolling freeways and providing free assistance to motorists. FSP can provide basic services such as towing, jump starts, furnishing fuel, and flat tire repair for disabled vehicles. FSP assistance can clear minor incidents from travel lanes to quickly reopen the roadway and minimize congestion and risk of secondary crashes. For major incidents, FSP can deploy temporary traffic control devices to divert traffic around incidents and increase safety at the scene prior to arrival of emergency services.

Currently, FSP operate in Districts 5 and 8. District 5 has FSP covering the Reading area (US 222, PA-12, and US 422) and the Lehigh Valley area (I-78, US 22, and PA-309). Both FSPs operate Monday-Friday during AM and PM peak hours and consist of two trucks plus a spare truck. District 8 FSPs operate on I-81, I-83, I-283, US 15, US 22/322, and PA-581 in the Harrisburg area. The PTC also has their own FSP program, sponsored by State Farm insurance, covering the Turnpike roadways in the region.

Identified Freeway Service Patrol needs include:

- I-81 Corridor, Wilkes-Barre/Scranton (District 4-0)
- Expand hours/number of trucks and also expand coverage to include PA-33 for Lehigh Valley FSP (District 5-0)
- Expand hours and extend coverage on US 222 for Berks FSP (District 5-0)
- Extending existing I-81 FSP to include Carlisle area and north to I-78 (District 8-0)
- I-81/US 30, Franklin County (District 8-0)
- US 30 Corridor, Lancaster and York Counties (District 8-0)
- US 222 and PA-283, Lancaster County (District 8-0)
- I-83, York (District 8-0)

Safety Systems

While TIM Teams and Freeway Service Patrols are vital aids in improving response to traffic incidents, there are also a number of TSMO solutions that can reduce the occurrence of incidents in the first place. Some examples that could be beneficial in the Eastern Region include Bridge De-Icing and Dynamic Curve Warning systems.

Bridge De-Icing utilizes technology to prevent snow and ice accumulation on bridge decks during winter storms. PennDOT has utilized the Fixed Anti-Icing Spray Technology (FAST) system at various locations in the state. This system consists of a series of spray disks that deliver a freeze point depressant agent, in a pre-prescribed amount, determined by the roadway surface condition. Nearby Road Weather Information System (RWIS) locations are typically utilized to determine the current roadway surface temperature and condition. RTMC personnel are notified when the system is activated. The latest bridge de-icing technology utilizes heating elements incorporated into the deck surface instead of the sprayer system. Electric resistance cables or pipes with heated liquid can be buried within the pavement to warm the bridge and reduce snow and ice accumulation. If possible, this type of technology could be incorporated when a bridge deck is already planned for reconstruction. The following bridges, which have a history of winter-related crashes, were identified as potential candidates for such a system:

- I-81 at Exit 206, Lackawanna County (District 4-0)
- I-81/I-83 Flyover Ramps, Dauphin County (District 8-0)
- I-83 over Conewago Creek, York County (District 8-0)

Dynamic Curve Warning systems provide feedback to vehicles approaching a horizontal curve at unsafe speeds. Vehicle speeds are detected upstream of the curve by radar or other ITS devices and trigger a controller that activates electronic sign elements and/or DMS to warn the speeding driver to slow down prior to the curve.

In most cases, Dynamic Curve Warning should be installed only after other, more low-cost, improvements have been installed and have not achieved the desired reduction in crashes. Low-cost improvements would include signage, delineation treatments, high friction surface treatments, and other similar solutions.

Dynamic Curve Warning needs were identified by evaluating curved road crash clusters within PennDOT One Map. These clusters were tiered and the highest-ranking curved road crash locations were evaluated to determine if an ITS solution was warranted or if low-cost improvements should be attempted first. The following locations were found to be good candidates for Dynamic Curve Warning:

- I-81 at Exit 206, Susquehanna County (District 4-0)
- I-81 at Exit 211, Susquehanna County (District 4-0)
- I-81 at Exit 223, Susquehanna County (District 4-0)
- I-81, near MM 108, Schuylkill County (District 5-0)
- I-80, MM 274-277, Carbon County (District 5-0)
- I-80/I-380 Interchange, Monroe County (District 5-0)
- US 222 ramps at US 422 Interchange, Berks County (District 5-0)
- US 222 northbound ramp at Bus. US 222, Berks County (District 5-0)
- US 22/322, near Midway exit, Perry County (District 8-0)
- PA-72 (Ebenezer Road), near Thompson Avenue, Lebanon County (District 8-0)
- I-81, MM 93, Lebanon County (District 8-0)

Another incident management need that was identified was a lack of access and crossovers on I-81 in northern Susquehanna County. Between New Milford and Great Bend, there are no access locations for emergency vehicles to get to incident locations and there is only one crossover for use in relieving trapped queues. Emergency access locations and movable barrier or other crossover methods would improve incident response time and incident clearance time, improving safety along the corridor.

Traveler Information

Traveler information is vital to improving the efficiency of the transportation system. When drivers are notified of real-time operating conditions, they can make informed decisions. This leads to a better distribution of traffic across the roadway system and maximizes efficiency. Timely information can also keep queues from continuing to build when closures occur due to crashes or weather conditions, increasing safety for all road users.

The focal point of traffic operations and traveler information dissemination for the Eastern Region is the Eastern Regional Traffic Management Center (ERTMC), located at the Pennsylvania Emergency Management Agency (PEMA) Center in Harrisburg. Through the ERTMC, travelers can be informed of roadway conditions, incidents and crashes, construction and maintenance activities, and weather conditions. ERTMC operators utilize DMS to disseminate this traveler information. In addition, the information is also distributed via the 511 Pennsylvania Traveler Information System (511PA) website and smart phone application.

In recent years, the distribution of traveler information from third party developers has greatly increased. Now many drivers use apps such as Waze as part of their daily commuting habits. Despite this development, ITS devices still provide an easy and widely used source of traveler information.

ITS Device Gaps

Along the region's interstates, an array of traveler information devices has already been installed and a network of CCTV cameras provides the RTMC with reliable situational awareness for many locations along the interstate network. Gaps do exist where further ITS deployments should occur.

Meanwhile, ITS devices are much less frequent along the region's non-interstate roadways, with notable exceptions on US 22 in the Lehigh Valley, US 30 between Lancaster and York, and the recently added devices in the Reading area along US 222, US 422, and PA-12. This leaves a number of other major limited-access highways and even arterials which could benefit from ITS deployments. Thought should also be given to strategically placed pre-entry devices to warn drivers of possible closures before they enter limited-access roadways.

Filling ITS device gaps has been identified as a key component of the Traveler Information needs for this ROP. These gaps are sometimes aligned with particular problem areas identified in the review of congestion and safety data but other gaps were identified based on location of other devices and the need to fill in missing links in the ITS system, as coordinated through the stakeholder process. High-definition (HD) CCTV cameras are recommended, as are full-color DMS. **Table 15** shows some of the key ITS gaps identified.

TABLE 15: ITS DEVICE GAPS

PennDOT District	Location	ITS Devices Needed
4	PA-309, near Mountain Top	Type A DMS
4	Montage Mountain Rd., before I-81	Type A DMS
4	I-81 and Northeast Extension, Scranton	Travel Times
4	I-81 and US 11 Corridors, Susquehanna County	CCTV, DMS
4	PA-267, near Choconut (Susquehanna County)	RWIS
4	I-84 Corridor, Pike County	CCTV, DMS, RWIS
5	I-81, Schuylkill County	Upgrade DMS
5	I-80, Carbon/Monroe Counties	Upgrade DMS
5	PA-33, US 22 to I-78	CCTV, DMS
5	PA-378, Northampton County	CCTV, DMS
5	I-78, Berks County	CCTV, DMS, RWIS
5	US 222 North Corridor, Berks County	CCTV, DMS
5	US 222, between Mohns Hill Rd. and Bus. US 222	CCTV
5	PA-100, near Boyertown	CCTV, DMS
5	PA-12 at River Rd. and at PA-183	CCTV
5	US 422 westbound, east of Bus. US 422 split	DMS, CCTV
8	Perry County (US 22/322 and US 11/15)	CCTV, DMS
8	I-78, MM 2	CCTV

PennDOT District	Location	ITS Devices Needed
8	I-81, MM 48, 56, 66, 69, and 76	CCTV
8	I-283, MM 1.5	CCTV
8	I-83, MM 2, 10, 12, 15, 17, 26, 38	CCTV
8	I-81, I-83, and I-283 at existing DMS locations	CCTV
8	I-81 South, Exits 49 and 80	DMS
8	I-83 Corridor (including southbound at MM 6)	DMS, Travel Times
8	US 15, Dillsburg	CCTV, DMS
8	US 30, east of Lancaster	CCTV, DMS
8	PA-501, north of Turnpike	RWIS
8	Pre-entry locations, Districtwide	DMS

TMC Operations

With the increasing number of ITS devices, consideration should be given to expansion of TMC facilities and staff, both at the Regional and District level. The identification of a number of signalized corridors for Unified Command and Control operations would particularly require an increased burden on staffing needs.

A need for adjustable workstations was also identified for the District 5-0 TMC. Other facility needs such as number of workstations, number of monitors, etc. should also be considered as TSMO and ITS operations continue to expand within the Eastern Region.

Communications Network

In order to best operate many of the ITS devices and traffic signal upgrades needed throughout the region, a robust communications network is required. The installation of a fiber along key corridors would provide PennDOT with the means for facilitating a high-bandwidth connection to ITS field devices, other agencies, and equipment through a state-owned and maintained network. A properly designed fiber optic communications network is highly reliable and will supply the bandwidth necessary to transmit current and future data and video to and from the RTMC.

By utilizing the region's interstates as a pathway to establish the fiber backbone installation, all conduit, cabling, and communications equipment would be installed within the limited access right-of-way, which will help mitigate any possible damage to cable or equipment infrastructure due to uncoordinated digging activities near PennDOT underground infrastructure (exacerbated by the fact that PennDOT is not a listed utility as part of Pennsylvania's One-Call system). In addition, the installation of primary backbone facilities along the interstate roadway network provides logical connections for expansion to major arterial facilities via interchanges.

Once deployed, the fiber optic backbone network does not require any additional leasing costs to maintain. The high bandwidth that is provided by a properly designed fiber optic backbone network also provides scalability as additional data and video needs are realized in the future. It should be noted that the up-front installation cost of a fiber backbone network is substantial compared to leasing costs on a device-by-device basis, but the installation of fiber will begin to realize cost savings once fully deployed.

Another possible alternative for expansion of the regional fiber network is the use of Public-Private Partnerships (P3). Elsewhere in the Commonwealth and throughout the country, P3 agreements between public and private sectors are being undertaken to facilitate fiber expansion. This provides important upfront funding of public projects while normally providing potential for long-term benefits to the private entities involved.

A potential P3 agreement could allow a private company to install a large fiber network within PennDOT's right-of-way. This network would accommodate PennDOT's existing and future data communications needs while also allowing the private firm to generate revenue from third party broadband customers. This could also aid the Department in building their fiber network while likely resulting in an overall cost savings as well.

Currently, PennDOT is studying potential opportunities and developing a plan for a statewide fiber optic network. Once this plan is finalized, future projects should be coordinated with its findings to assist in expanding the network. The following corridors have been identified as regional fiber network needs:

- I-80/I-81 Corridors (District 5-0)
- I-78, US 22, PA-33 Corridors, Lehigh/Northampton Counties (District 5-0)
- I-78, US 222, US 422 Corridors, Berks County (District 5-0)
- US 30 Corridor, Franklin/Adams/York Counties (District 8-0)
- PA-283/I-283 Corridor, Dauphin County (District 8-0)

Multimodal Connectivity

The core philosophy of TSMO is to maximize the existing roadway capacity available to improve operations. With that in mind, enhancing non-single occupant vehicle mode choices can provide significant improvements. In addition to improving congestion, multimodal investment can also decrease fuel consumption, minimize the impacts of emissions thereby improving air quality, and provide economic development through an equitable transportation network.

In order for modes of transportation to be successful, connectivity between each mode should be safe, efficient, and convenient. Transportation alternatives include walking, bicycling, rail, bus transit, carpooling, vanpooling, and other options.

In recent years, on-demand transportation options have grown. This new growth in shared mobility includes a modest but growing bike share network in Harrisburg. Transportation Network Companies (TNCs) such as Uber and Lyft provide ride-hailing services which can replace personal vehicle trips but also have detrimental effects on transit ridership and congestion. Other shared mobility options have become popular in cities throughout the country and could come to the region in the future, including dockless networks of shared bikes and scooters.

A large variety of multimodal needs were identified in the stakeholder process, including:

- Bike trail maintenance
- Filling gaps between existing trails
- Expansion of on-street bike infrastructure

- Bike Share expansion
- Transit Signal Priority on key bus corridors
- Dedicated bus lanes and queue jumps

Bike Network Needs

While the Eastern Region does not include any large cities on the scale of Philadelphia or Pittsburgh, it is home to a number of small to medium size cities which include dense urban grids which are ideally suited for more active modes of transportation. The region is also home to a number of beautiful trails which are heavily used for recreation. In order to produce beneficial mode change, cycling needs to shift from largely recreational to a legitimate transportation method. This means providing a safe, connected network for all ages and abilities of cyclists and potential cyclists. Gaps in trail networks need to be filled and on-street bike infrastructure needs to be expanded in a thoughtful way to provide connections between residents and the jobs and services they need.

Fortunately, a number of planning partners have recently completed or are in the process of completing updated active transportation plans. Lancaster completed their Active Transportation Plan in April 2019 while LVPC just released their draft Active Transportation Plan, *Walk/Roll LV*, in December 2019.

The Lancaster Active Transportation Plan provides a comprehensive study of existing conditions and public outreach. The recommended active transportation network has three key components: corridor improvements, mobility hubs, and shared use trails. The bike network corridors are split into short-, mid-, and long-term priorities. The following short-term priority projects were determined to create momentum for building the complete low stress bicycle network outlined in the plan:

- Christian Street Bike Boulevard: proposed north-south bike boulevard in Downtown Lancaster on low volume street which would include a variety of traffic calming measures.
- Farnum – Duke Connection: this would include a potential Complete Street design on Duke Street, bicycle boulevard and contraflow bike lane on Farnum Street and connection to the Christian Street Bike Boulevard noted above.
- Prince Street – James Street Intersection: this would provide safe connections to a pocket park at the intersection with high visibility crossings to provide transitions between bicycle facilities at this unconventional intersection.
- Walnut Street and Chestnut Street Separated Bike Lanes: pair of one-way separated bike lanes which would provide east-west connections through the City to Lancaster as well as connecting to the proposed Greater Lancaster Heritage Pathway, a shared use trail that would run approximately 15 miles from the City of Lancaster east to Leola. Walnut Street protected bike lane has been implemented since the release of this study.

The Walk/Roll LV plan provides a number of recommendations including priority pedestrian areas and bicycle network recommendations. Bike network recommendations are comprised of Bicycle Commuting Corridors and Catalytic Projects. Bicycle Commuting Corridors have the potential to facilitate bicycling to work or to public transit as part of a commute trip. Catalytic projects have the potential to spark interest and use of active transportation for cycling as transportation for errands, social, and recreational trips, as well as work trips.

Three Bicycling Commuting Corridors and three catalytic projects were specified through the ROP stakeholder process to have the most potential positive impact on operations. The Bicycle Commuting Corridors include:

- Hamilton Street (Ott Street to Sixth Street): would include separated bike lanes, including potential parking protected bike lanes and sidewalk level lanes at various points of the corridor.
- Liberty Street (Cedar Crest Boulevard to Fourth Street: would include conversion of the corridor to a neighborhood greenway, including a number of traffic calming methods. These methods could potentially include median island traffic diverters, mini roundabouts, and intersection improvements.
- Hamilton Street/Hanover Avenue (Sixth Street to Eaton Avenue): would include a number of location-specific bike improvements along the corridor, including sidewalk level separated bike lanes, a multiuse path over the Hamilton Street Bridge, intersection improvements.

The catalytic projects identified as ROP needs include:

- D&L National Heritage Corridor: would include trails along each side of the Lehigh River, new trailheads, and upgrade of existing bridges.
- 7th St/MacArthur Rd Multimodal Improvements: would include an enhanced trail crossing where the Jordan Creek Greenway crosses MacArthur Road, as well as a number of other multimodal improvements for pedestrian and transit modes to change this six-lane arterial into a Complete Street, enhancing safety and mobility for all road users.
- Complete Broad St: would include design changes to existing wide corridor, including integration of separated bike lanes, reduction of conflicts at intersections, and traffic calming.

In addition to these completed studies, Harrisburg and Wilkes-Barre/Scranton have bike/ped plans currently in process. Once complete, study recommendations should be considered for inclusion in future ROP updates. The Berks County Bicycle and Pedestrian Transportation Plan was also recently adopted in July 2020. A major component of the Plan is the completion of the Schuylkill River Trail north from Reading to Hamburg, along with future connections to the Trail. The trail will act as the "spine" of the non-motorized network in Berks County.

Another bike-related need is expansion of bike sharing networks in the region. Currently Harrisburg, York, Lancaster, and other cities in the region have bike share network which were operated by Zagster who recently ceased operations. Identifying a new operator to maintain these existing systems is an important and concerning issue. A potential wider bike share network for the Lehigh Valley, particularly Allentown, should also be prioritized. Expansion of the Scranton and Carbondale Bike Share Program, operated by Lackawanna Heritage Valley Authority, should be considered. Bike share networks should also be considered for other dense areas of the region. To be successful though, it is important for these bike share systems to have safe, connected bike infrastructure so that residents and visitors are comfortable to ride.

Pedal assist electric bicycles (e-bikes) should also be considered for bike share networks. These bikes have an integrated electric motor that provides pedal assist to the cyclist. This would extend the practical area the bikes could be used and open up a wider range of potential users. E-bikes have proven to be a transformational component for cities addressing safety concerns from traffic violence, with increased use of e-bikes helping to address congestion, air quality, parking, and mode shift challenges. Early indicators

from Los Angeles, Sacramento, Chicago, and Minneapolis show that cities and regions will be most successful if they implement public, electric-vehicle charging infrastructure to accommodate e-bikes and integrate that public hardware with existing transit offerings.

Transit Needs

Transit for most of the Eastern RTMC Region consists of bus networks, though Amtrak does make a few stops in the area and provides connections between New York City, Philadelphia, Harrisburg, and Pittsburgh. In order to produce impactful mode change to transit, improvements in frequency as well as speed and reliability are needed. This requires reprioritizing rights-of-way to emphasize transit. This can be achieved through a variety of infrastructure improvements, including, but not limited to: dedicated transit lanes, queue jumps, transit signal priority (TSP), stop bumpouts, and real-time information systems for users (such as real-time parking capacity signage at highway exits for park and ride facilities). TSP can either extend green time or shorten red time upon receiving a priority request signal from transit vehicles, allowing them to move more efficiently along corridors and provide faster, more reliable service.

Design guidance should be considered from the National Association of City Transportation Officials (NACTO) Transit Street Design Guide. The document provides design guidance for the development of transit facilities on city streets, and for the design and engineering of city streets that prioritize transit, improve transit service quality, and support other goals related to transit.

Capital Area Transit, transit provider for the Harrisburg area, is currently working on a bus network redesign. Potential projects arising from this plan should be considered for future ROP updates. Current transit needs determined through the stakeholder process include the following:

- Transit Operations Studies for the Lancaster, Reading, and Wilkes-Barre/Scranton areas, including identification of corridors for transit prioritization, such as dedicated bus lanes, queue jumps, and TSP. The Lancaster study should also look to improve connectivity between Amtrak station and Downtown. The Lancaster and Reading studies can also utilize the latest South Central Transit Authority Transit Development Plan, which recommends the following corridors for prioritizing transit:
    - Lancaster: Orange and King Streets, Prince Street, Queen and Duke Streets
    - Reading: 5th Street, 10th and 11th Streets, Penn Street, and Perkiomen Avenue
- The Lackawanna Cutoff Restoration Commuter Rail Study was completed in March 2020 and describes restoration of passenger train service between Scranton and Hoboken. With the large number of commuters traveling between Northeastern Pennsylvania and the New York area, this would have a transformative effect on travel patterns and could provide notable congestion relief on the I-80 corridor.
- LANTA, transit provider for Lehigh and Northampton counties, has proposed an Enhanced Bus Service which would include two routes connecting MacArthur Road and Allentown to Bethlehem and Easton. These routes would provide a strong spine to the Lehigh Valley's transit network and support shifting the area to a more multimodal future. The ROP should support this project as an important operations need. In addition to the determined routes, needs arising from this project also include potential Park-n-Rides on MacArthur Road, near the PA-412/I-78 interchange, and along Cedar Crest Boulevard and Hamilton Boulevard.

- The Wescosville Park-n-Ride is often at capacity and should be considered for expansion. This expansion could also be coupled with a Smart Parking system which could detect space availability and broadcast that information to nearby drivers via DMS and various phone apps.
- LANTA routes 102 and 322 run along Hamilton Boulevard past Dorney Park. Existing pedestrian crossing conditions are extremely dangerous, and buses are often caught in congestion, reducing speed and reliability of service. Potential improvements include safer pedestrian infrastructure at desired crossing locations and studying potential Bus on Shoulder operations.
- Pedestrian Access should also be improved along PA-100 near I-78. The expansion of warehousing and distribution centers in the area have increased congestion and increased demand for transit. Lack of sidewalks and safe crossings on the roadway network around these facilities has made providing reliable transit service difficult.
- The existing East Stroudsburg Park-n-Ride should be considered for expansion and possible transit improvements. The site is currently just used for carpooling and intercity bus service.
- A regionwide Park-n-Ride study should be considered to evaluate utilization of existing lots, demand for increased parking spaces, and feasibility of transit service expansion to high usage carpool only lots. The study should also look at best practices for ownership and maintenance of these sites.

Freight Management

The economic vitality of Eastern Pennsylvania depends on the safe and efficient movement of people, goods, and materials, into, through, and out of the region. The major interstates and other aspects of the roadway network are important components of the regional freight network. The other network components include the airports, rail lines, and waterways.

The growth of warehousing and distribution centers throughout the region in recent years has been significant. This has led to the growth of truck-based freight movement, where two areas of concern were identified in terms of operations planning: truck parking and winter truck restrictions.

The increasing truck traffic, combined with more stringent hours of service regulations on drivers, have resulted in a noticeable increase in illegal truck parking. Truck drivers at the end of their allowable daily hours find parking areas full and are forced to park on shoulders of ramps and other dangerous locations overnight. The Pennsylvania Turnpike Commission is currently planning to deploy a truck parking management system, initially in the central and eastern portions of the state, to detect available parking spaces and distribute that information to drivers so they can make smarter, safer parking decisions. A study of truck parking is needed to evaluate needs throughout the rest of the Eastern Region as well, both to analyze use of a similar truck parking system on PennDOT roadways, as well as to evaluate where additional parking capacity is needed and can possibly be provided.

Another recent freight issue is the more proactive weather-related truck restrictions that have been instituted on interstates throughout the state, as previously mentioned in the **Traveler Information and Situational Awareness** section. The impacts these restrictions have on parallel arterials as truck traffic shifts off of the interstates should be analyzed to determine the best and safest course of action. A regionwide study of this issue would be beneficial so that policy revisions can be instituted for subsequent winter seasons.

Operational Teamwork/Institutional Coordination

Teamwork and coordination amongst the various transportation agencies and other entities in the region are vital to ensure a well-functioning transportation system. TIM Teams, as mentioned above, are a great example of the type of interdisciplinary collaboration that can develop from these partnerships. Another example of this type of teamwork and coordination can be found in the ITS Architecture update processes, which were led by PennDOT.

ITS Architecture was last updated between 2004 and 2005 for each of the three Districts, providing a roadmap for transportation systems integration throughout the region. This involved a highly cooperative effort between transportation agencies representing all the region's transportation modes. The overarching framework developed through this process provides a glimpse at the various ITS-related relationships that span the region and all of the stakeholder agencies. The latest ITS Architecture for each of the three Districts can be found online here:

https://www.penndot.gov/ProjectAndPrograms/operations/Pages/TSMO-Eastern-Region.aspx

These collaborative relationships and documents should continue to be maintained as they provide a multitude of positive impacts on transportation operations and safety in the region. An updated ITS Architecture for the Eastern Region should be considered to reflect the different stakeholders and technology which have emerged since this last update.

Through the stakeholder process, a number of potential study needs and potential initiatives were identified that would improve operational teamwork and institutional coordination in the region.

- Hersheypark Event Management: need to improve ingress/egress to events at Hersheypark.
- Lebanon Valley Expo Center Event Management: need to improve operations during events at the Lebanon Valley Expo Center.
- PA Renaissance Faire Event Management: need to improve operations during Pennsylvania Renaissance Faire events.
- Jim Thorpe Event Management: need to improve operations during seasonal events in Jim Thorpe (Fall Foliage, St. Patrick's Day, Winterfest).
- Pocono Raceway Event Management: need to improve ingress/egress to events at Raceway. Consider part-time shoulder use.
- Koziar's Christmas Village Event Management: need to improve operations during seasonal events.
- NYSDOT Coordination: collaboration on incident management and traveler information for I-81 Corridor near New York state line

Chapter 5. Strategies and Projects

ROP Projects

Based on the Transportation Issues and Operational Needs identified in the previous chapter, a set of projects were developed for inclusion in this Regional Operations Plan. Once the types of congestion were identified and classified for each area, the most appropriate TSMO tools and strategies were determined, thereby developing projects. The TSMO Guidebook includes the following table, which provides a matrix for matching tools and strategies with the varying types of congestion.

TABLE 16: TSMO SOLUTION APPLICABILITY

TSMO Solution	Causes of Congestion					
	Recurring Congestion		Unplanned Events		Planned Events	
	Bottlenecks	Poor Signal Timing	Traffic Incidents	Inclement Weather	Work Zones	Special Events
Bridge De-icing				X		
Closed Circuit TV Cameras (CCTV)	X		X	X	X	X
Dynamic Curve Warning			X	X		
Dynamic Message Signs (DMS)	X		X	X	X	X
Dynamic Rerouting	X		X		X	X
Flex Lanes	X		X		X	X
Freeway Service Patrols			X		X	X
Integrated Corridor Management	X	X	X	X	X	X
Junction Control	X		X		X	X
Managed Lanes	X					
Queue Warning	X		X		X	X
Ramp Metering	X		X			X
Road Weather Info. Systems (RWIS)				X		
Smart Corridor Initiatives	X	X	X	X	X	X
TIM Teams			X			X
Traffic Incident Detection			X			
Traffic Management Center	X	X	X	X	X	X
Traffic Signal Enhancements		X				
Transit Signal Priority		X				
Traveler Information	X		X	X	X	X
Variable Speed Displays	X		X	X	X	

A number of the strategies in the above table were included as part of the projects in this ROP, including:

- Bridge De-Icing
- Closed Circuit TV Cameras (CCTV)
- Dynamic Message Signs (DMS)

- Freeway Service Patrols
- Integrated Corridor Management
- Junction Control
- Queue Warning
- Road Weather Info. Systems (RWIS)
- Smart Corridor Initiatives
- TIM Teams
- Traffic Management Center
- Traffic Signal Enhancements
- Transit Signal Priority
- Traveler Information
- Variable Speed Displays

In addition to the strategies outlined above, other multimodal tools and strategies were also identified and included in ROP projects, including the following:

- Integrating transit information into Integrated Corridor Management projects
- Dedicated transit lanes, queue jumps, curb bumpouts and other physical improvements to prioritize transit movement
- Park-n-Ride planning, coordination, and expansion
- Expansion of bike lanes, trails, and other bike infrastructure
- Support of Bike Share programs
- Truck Parking Management Systems

In total, 85 projects were identified for inclusion in this document, spanning the entire Eastern RTMC Region. With such a diverse set of needs areas and project types, prioritization by a simple metric would be difficult. Therefore, in addition to the operational and safety data utilized to develop and evaluate projects, stakeholder input was utilized to help determine the highest priority projects. Due to COVID-19 pandemic, the final stakeholder meetings were held remotely. If the meeting had been held in person, a sticker dot voting process was planned to gather each stakeholder's project priorities. In lieu of this, stakeholders were emailed maps of potential ROP projects and an accompanying spreadsheet listing the details of the projects. Stakeholders reviewed these documents and provided a ranked top 10 projects. This voting process was considered alongside available data to classify each project as high or medium priority. Other projects which received no votes or minimal votes were also put into a list of other considerations for the future. Projects were also classified by short-term or long-term, depending on the types of tools and strategies involved and the varying complexity and relative cost of the project.

Table 17 summarizes the high priority projects while **Table 18** summarizes the normal priority projects. Where multiple stakeholders are listed, the bolded name is determined to be the primary stakeholder. Maps of the projects are also provided in **Appendix B**. For further detail on each project, please refer to **Appendix C**.

TABLE 17: HIGH PRIORITY PROJECTS

Project #	Project	Priority Area	Stakeholders*	Planned Improvements
CN.01	Dauphin I-283/PA-283 ITS Fiber Interconnect	Communications Network	PennDOT District 8-0	Fiber Deployment
FA.01	Tilghman St. Signal Improvements	Freeway and Arterial Operations	PennDOT District 5-0	Traffic Signal Improvements
FA.02	Cressona Signal Improvements	Freeway and Arterial Operations	PennDOT District 5-0	Traffic Signal Improvements
FA.03	Tamaqua Signal Improvements	Freeway and Arterial Operations	PennDOT District 5-0	Traffic Signal Improvements
FA.04	US 22/I-78 ICM	Freeway and Arterial Operations	PennDOT District 5-0	ICM, CCTV, DMS, Travel Times, Traffic Signal Improvements, Variable Speed Limits, Queue Detection, Flex Lanes, Fiber Deployment
FA.05	I-81 ICM (D8)	Freeway and Arterial Operations	PennDOT District 8-0	ICM, CCTV, DMS, Traffic Signal Improvements, Queue Detection, Transit/Pedestrian Improvements
FA.06	Cameron St. Signal Improvements	Freeway and Arterial Operations	PennDOT District 8-0	Traffic Signal Improvements
MC.01	LVPC Walk/Roll Bicycle Commuting Corridors	Multimodal Connectivity	**LVPC**, PennDOT District 5-0	On-Street Bike Infrastructure
MC.02	LANTA Enhanced Bus Service	Multimodal Connectivity	**LANTA**, PennDOT District 5-0, LVPC	Transit Improvements, Park & Ride
TI.01	District 4-0 ITS Gaps	Traveler Information	PennDOT District 4-0	DMS
TI.02	I-84 Corridor ITS	Traveler Information	PennDOT District 4-0	CCTV, DMS, RWIS
TI.03	Susquehanna County ITS Gaps	Traveler Information	PennDOT District 4-0	CCTV, DMS
TI.04	D8 Interstate CCTV Gaps	Traveler Information	PennDOT District 8-0	CCTV
TI.05	D8 Interstate DMS Gaps	Traveler Information	PennDOT District 8-0	DMS
TI.06	D8 Interstate CCTV DMS Gaps	Traveler Information	PennDOT District 8-0	CCTV
TI.07	US 222 Corridor ITS	Traveler Information	PennDOT District 5-0	CCTV, DMS
TI.08	District 5-0 CCTV Gaps	Traveler Information	PennDOT District 5-0	CCTV
TI.09	District 5-0 DMS Gaps	Traveler Information	PennDOT District 5-0	DMS
TI.10	District 5-0 Replace Existing Portable CMS	Traveler Information	PennDOT District 5-0	DMS
TIM.01	District 5-0 Curve Warning	Traffic Incident Management	PennDOT District 5-0	Dynamic Curve Warning

Project #	Project	Priority Area	Stakeholders*	Planned Improvements
TIM.02	Berks Freeway Service Patrols	Traffic Incident Management	PennDOT District 5-0	Freeway Service Patrol
TIM.03	I-81 Freeway Service Patrol	Traffic Incident Management	**PennDOT District 8-0**, Harrisburg MPO	Freeway Service Patrol
TIM.04	South Central Freeway Service Patrols	Traffic Incident Management	**PennDOT District 8-0**, York MPO, Lancaster MPO	Freeway Service Patrol
TIM.05	I-81 Safety Systems	Traffic Incident Management	PennDOT District 4-0	Dynamic Curve Warning, Bridge De-Icing
TIM.06	US 222/US 422 Curve Warning	Traffic Incident Management	PennDOT District 5-0	Dynamic Curve Warning

* If multiple stakeholders, primary stakeholder in **bold**

TABLE 18: OTHER RECOMMENDED PROJECTS

Project #	Project	Priority Area	Stakeholders*	Planned Improvements
CN.02	US 30 Fiber Deployment	Communications Network	PennDOT District 8-0	Fiber Deployment
FA.07	PA-924 Ramp Preemption	Freeway and Arterial Operations	PennDOT District 4-0	Traffic Signal Improvements
FA.08	Marysville Signal Improvements	Freeway and Arterial Operations	PennDOT District 8-0	Traffic Signal Improvements
FA.09	US 22/322 Ramp Metering	Freeway and Arterial Operations	PennDOT District 8-0	Ramp Meter
FA.10	Jim Thorpe Operations Improvements	Freeway and Arterial Operations	PennDOT District 5-0	TBD
FA.11	Church St. Signal Improvements	Freeway and Arterial Operations	PennDOT District 4-0	Traffic Signal Improvements
FA.12	Davis St. Signal Improvements	Freeway and Arterial Operations	PennDOT District 4-0	Traffic Signal Improvements
FA.13	Wilkes-Barre Signal Improvements	Freeway and Arterial Operations	PennDOT District 4-0	Traffic Signal Improvements
FA.14	Milford Operations Improvements	Freeway and Arterial Operations	PennDOT District 4-0	Traffic Signal Improvements, CCTV, DMS
FA.15	Downtown Easton Signal Improvements	Freeway and Arterial Operations	**PennDOT District 5-0**, LANTA	Traffic Signal Improvements
FA.16	Emmaus Ave. Signal Improvements	Freeway and Arterial Operations	PennDOT District 5-0	Traffic Signal Improvements
FA.17	Hill to Hill Bridge Signal Improvements	Freeway and Arterial Operations	PennDOT District 5-0	Traffic Signal Improvements
FA.18	PA-100 Signal Improvements	Freeway and Arterial Operations	PennDOT District 5-0	Traffic Signal Improvements
FA.19	PA-329 Signal Improvements	Freeway and Arterial Operations	PennDOT District 5-0	Traffic Signal Improvements
FA.20	US 222 Signal Improvements	Freeway and Arterial Operations	PennDOT District 5-0	Traffic Signal Improvements
FA.21	Palmerton Signal Improvements	Freeway and Arterial Operations	PennDOT District 5-0	Traffic Signal Improvements
FA.22	Boyertown Signal Improvements	Freeway and Arterial Operations	PennDOT District 5-0	Traffic Signal Improvements

Project #	Project	Priority Area	Stakeholders*	Planned Improvements
FA.23	Waynesboro Signal Improvements	Freeway and Arterial Operations	PennDOT District 8-0	Traffic Signal Improvements
FA.24	Carlisle Signal Improvements	Freeway and Arterial Operations	PennDOT District 8-0	Traffic Signal Improvements
FA.25	Governor Rd Signal Improvements	Freeway and Arterial Operations	PennDOT District 8-0	Traffic Signal Improvements
FA.26	I-83 Queue Warning	Freeway and Arterial Operations	PennDOT District 8-0	Queue Detection, DMS
FA.27	Lancaster Signal Improvements	Freeway and Arterial Operations	PennDOT District 8-0	Traffic Signal Improvements
FA.28	PA-741 Signal Improvements	Freeway and Arterial Operations	PennDOT District 8-0	Traffic Signal Improvements
FA.29	Lititz Pk/Oregon Pk Signal Improvements	Freeway and Arterial Operations	PennDOT District 8-0	Traffic Signal Improvements
FA.30	US 30 Queue Warning	Freeway and Arterial Operations	PennDOT District 8-0	Queue Detection, DMS
FA.31	Lebanon Signal Improvements	Freeway and Arterial Operations	PennDOT District 8-0	Traffic Signal Improvements
FA.32	US 30 York Signal Improvements	Freeway and Arterial Operations	PennDOT District 8-0	Traffic Signal Improvements
FA.33	Gettysburg Signal Improvements	Freeway and Arterial Operations	PennDOT District 8-0	Traffic Signal Improvements
FA.34	I-81 (Wilkes-Barre/Scranton) ICM	Freeway and Arterial Operations	**PennDOT District 4-0**, Lackawanna/Luzerne MPO, COLTS, Luzerne Transit	ICM, Queue Detection, Ramp Meters, Flex Lanes, Traffic Signal Improvements, Transit Improvements
FA.35	I-80 (Monroe) ITS	Freeway and Arterial Operations	**PennDOT District 5-0**, NEPA MPO, Martz, Monroe County Transit Authority	CCTV, DMS, Junction Control, Ramp Meter, Variable Speed Limits, Transit Improvements, Traffic Signal Improvements
FA.36	Downtown Reading Signal Improvements	Freeway and Arterial Operations	PennDOT District 5-0	Traffic Signal Improvements
FA.37	Wernersville-Wyomissing Signal Improvements	Freeway and Arterial Operations	PennDOT District 5-0	Traffic Signal Improvements
FA.38	US 30 ICM	Freeway and Arterial Operations	PennDOT District 8-0	ICM, Traffic Signal Improvements, DMS
MC.03	Lancaster Active Transportation Short-Term Priority Projects	Multimodal Connectivity	**City of Lancaster**, PennDOT District 8-0	On-Street Bike Infrastructure
MC.04	Lehigh Valley Bike Share	Multimodal Connectivity	**LVPC**, city governments	Bike Share
MC.05	Harrisburg Transit Connections	Multimodal Connectivity	**Harrisburg MPO**, CAT, PennDOT District 8-0	Transit Improvements
MC.06	Harrisburg Transit Priority	Multimodal Connectivity	**Harrisburg MPO**, CAT, PennDOT District 8-0	Transit Improvements
MC.07	LVPC Walk/Roll Catalytic Projects	Multimodal Connectivity	**LVPC**, PennDOT District 5-0	On-Street Bike Infrastructure/Trail Expansion

Project #	Project	Priority Area	Stakeholders*	Planned Improvements
MC.08	Wescosville Park & Ride Improvements	Multimodal Connectivity	**PennDOT District 5-0**, LVPC	Park & Ride
TIM.07	Wilkes-Barre/Scranton Freeway Service Patrols	Traffic Incident Management	**PennDOT District 4-0**, Lackawanna/Luzerne MPO	Freeway Service Patrol
TIM.08	Wilkes-Barre/Scranton TIM Team	Traffic Incident Management	**Lackawanna/Luzerne MPO**, PennDOT District 4-0, Local Municipalities, Emergency Personnel	TIM Team
TIM.09	Lehigh Valley Freeway Service Patrols	Traffic Incident Management	**PennDOT District 5-0**, LVPC	Freeway Service Patrol
TIM.10	Lehigh Valley TIM Team	Traffic Incident Management	**Lehigh Valley EMA**, LVPC, PennDOT District 5-0, Local Municipalities, Emergency Personnel	TIM Team
TIM.11	Reading TIM Team	Traffic Incident Management	**Reading MPO, PennDOT District 5-0**, Local Municipalities, Emergency Personnel	TIM Team
TIM.12	South Central TIM Team	Traffic Incident Management	**PennDOT District 8-0**, Planning Partners, Local Municipalities, Emergency Personnel	TIM Team
TIM.13	District 8-0 Curve Warning	Traffic Incident Management	PennDOT District 8-0	Dynamic Curve Warning, CCTV
TIM.14	I-81 Emergency Access	Traffic Incident Management	PennDOT District 4-0	Crossovers, Emergency Access Points
TIM.15	District 8-0 Bridge De-icing	Traffic Incident Management	PennDOT District 8-0	Bridge De-icing
TIM.16	US 15 Corridor Incident Management	Traffic Incident Management	**PennDOT District 8-0**, Adams MPO, Local Municipalities, Emergency Personnel	TIM Team, Parallel Route Improvements, Crossovers, Coordination
TI.11	D5 TMC Upgrades	Traveler Information	PennDOT District 5-0	TMC Upgrades
TI.12	Lebanon County RWIS	Traveler Information	PennDOT District 8-0	RWIS
TI.13	I-81/Northeast Extension Travel Times	Traveler Information	**PennDOT District 4-0**, Pennsylvania Turnpike	DMS, Travel Times
TI.14	US 11/15 Devices	Traveler Information	PennDOT District 8-0	CCTV, DMS
TI.15	US 22/322 Devices	Traveler Information	PennDOT District 8-0	CCTV, DMS
TI.16	US 30 ITS	Traveler Information	PennDOT District 8-0	CCTV, DMS, Traffic Signal Improvements
TI.17	District 8-0 DMS Interstate Approach Gaps	Traveler Information	PennDOT District 8-0	DMS
TI.18	Dillsburg ITS	Traveler Information	PennDOT District 8-0	CCTV, DMS
TI.19	District 5-0 CCTV Digital Retrofit	Traveler Information	PennDOT District 5-0	CCTV
TI.20	District 5-0 DMS Interstate Approach Gaps	Traveler Information	PennDOT District 5-0	DMS
TI.21	Berks ITS	Traveler Information	PennDOT District 5-0	CCTV, DMS, RWIS

* If multiple stakeholders, primary stakeholder in **bold**

Studies/Initiatives

In addition to the projects outlined above, a number of studies and initiatives were also developed as part of the ROP process. While specific projects could be determined for many of the issues and needs, others need further study to best to determine the correct mitigation to improve operations.

Information on the recommended operations-based studies and initiatives can be found in **Table 19**.

Other ROP Considerations

A number of other issues and needs were introduced during the stakeholder process and draft ROP projects and studies were developed. The projects listed in **Table 20** were discussed during this stakeholder process but received no votes or minimal votes during the prioritization process. These projects are listed below so that they remain in consideration for the future as needs and priorities change, and this document is updated.

Additionally, two appendices have been provided which detail concurrent efforts which tie in with the ROP and TSMO initiatives. **Appendix D** provides a list of Highway projects currently on the TIP which include ITS devices. These are noted so that, in case the scope of these projects change and these devices are not installed as part of these projects, they can be added as needs in future ROP updates. Meanwhile, **Appendix E** provides a list compiled by PennDOT's Center for Program Development & Management. This list includes TSMO project needs on the interstate system which have been previously identified. For the ERTMC, a total of 65 CCTV cameras, 5 center-mount DMS, and 90 two-post DMS are identified. Approximate costs for each fiscal year and the current funding are noted.

Table 19: Recommended Studies and Initiatives

Study	Priority Area	Stakeholders*	Notes
Lancaster Transit Operations Study	Multimodal Connectivity	**Lancaster MPO**, South Central Transit Authority	Identify corridors for transit priority treatments (bus lanes, queue jumps, Transit Signal Priority, etc.), improve connectivity between Amtrak/Downtown, identify Park & Ride expansion needs/opportunities. Consider Orange/King Sts., Prince St., and Queen/Duke Sts. For transit priority, per latest Transit Development Plan
Eastern RTMC Truck Parking Study	Multimodal Connectivity	PennDOT Central Office	Determine needs and locations for possible expansion of truck parking. Study possibility of installing Truck Parking Management System. Consider potential public-private partnership opportunities with private truck stop facilities. Coordinate with planned PennDOT Truck Parking Study.
Lebanon Valley Expo Center Event Management	Operational Teamwork/Institutional Coordination	Lebanon Valley Expo Center	Improve traffic management for special events.
Renaissance Faire Event Management	Operational Teamwork/Institutional Coordination	PA Renaissance Faire	Improve traffic management for events.

* If multiple stakeholders, primary stakeholder in **bold**

Table 20: Other Considered Projects and Studies

Project	Priority Area	Stakeholders*	Planned Improvements
Mountain Blvd. Signal Improvements	Freeway and Arterial Operations	PennDOT District 4-0	Traffic Signal Improvements
Scranton CBD Signal Improvements	Freeway and Arterial Operations	PennDOT District 4-0	Traffic Signal Improvements
Easton Ave. Signal Improvements	Freeway and Arterial Operations	PennDOT District 5-0	Traffic Signal Improvements
PA-191 Signal Improvements	Freeway and Arterial Operations	PennDOT District 5-0	Traffic Signal Improvements
PA-412 Signal Improvements	Freeway and Arterial Operations	PennDOT District 5-0	Traffic Signal Improvements
Sullivan Trail Signal Improvements	Freeway and Arterial Operations	PennDOT District 5-0	Traffic Signal Improvements
I-80 (Carbon/Monroe) Fiber Network	Communications Network	PennDOT District 5-0	Fiber Deployment
I-81 (Schuylkill) Fiber Network	Communications Network	PennDOT District 5-0	Fiber Deployment
PA-940 Signal Improvements	Freeway and Arterial Operations	PennDOT District 5-0	Traffic Signal Improvements
Berks County Fiber Network	Communications Network	PennDOT District 5-0	Fiber Deployment
I-283/PA-283 Ramp Signal Improvements	Freeway and Arterial Operations	PennDOT District 8-0	Traffic Signal Improvements
Hersheypark Event Management	Operational Teamwork/Institutional Coordination	**Hersheypark**, PennDOT District 8-0	Study, Traffic Signal Improvements

Project	Priority Area	Stakeholders*	Planned Improvements
Dillerville Rd. Flashing Yellow Arrows	Freeway and Arterial Operations	PennDOT District 8-0	Traffic Signal Improvements
Elizabethtown Signal Improvements	Freeway and Arterial Operations	PennDOT District 8-0	Traffic Signal Improvements
Fruitville Pk. Signal Improvements	Freeway and Arterial Operations	PennDOT District 8-0	Traffic Signal Improvements
Mt Joy Signal Improvements	Freeway and Arterial Operations	PennDOT District 8-0	Traffic Signal Improvements
New Holland Ave Signal Improvements	Freeway and Arterial Operations	PennDOT District 8-0	Traffic Signal Improvements
PA-501 Signal Improvements	Freeway and Arterial Operations	PennDOT District 8-0	Traffic Signal Improvements
PA-72 Signal Improvements	Freeway and Arterial Operations	PennDOT District 8-0	Traffic Signal Improvements
US 30/Greenfield Rd. Ramp Meter	Freeway and Arterial Operations	PennDOT District 8-0	Ramp Meter
Wilkes-Barre/Scranton Transit Operations Study	Multimodal Connectivity	**Lackawanna/Luzerne MPO**, COLTS, Luzerne Transit	Study
Pocono Raceway Event Management	Operational Teamwork/Institutional Coordination	Pocono Raceway	Study
Reading Transit Operations Study	Multimodal Connectivity	**Reading MPO**, South Central Transit Authority	Study
Koziar's Christmas Village Event Management	Operational Teamwork/Institutional Coordination	Koziar's Christmas Village	Study
Eastern Region Park & Ride Utilization Study	Multimodal Connectivity	PennDOT Central Office	Study
Eastern Region Winter Truck Restriction Impact Study	Multimodal Connectivity	PennDOT Central Office	Study

* If multiple stakeholders, primary stakeholder in **bold**

Chapter 6. ROP Coordination and Maintenance

Coordination and Maintenance

The first Regional Operations Plans in Pennsylvania were published in 2007. These led to the implementation of a number of successful ITS projects and other operational improvements. Since then, the plans have not been updated though and momentum was lost for further operations advancements.

It is intended that this process of updates should be continued every four years for the entire Eastern RTMC Region. Each update should include the status of any previous ROP projects, in addition to the discussion of current issues and needs, and the resulting additional projects to mitigate those issues and needs. An interim update should also be considered for two years after each full ROP is completed. Therefore, the ROP would be refreshed every other year, aligning with the TIP update schedule. The ROP schedule should be aligned so that it is published in the year prior to TIP updates, so that the ROP can be incorporated into the development of the TIP.

Aligning the ROP with the region's LRTPs would be ideal but, given the varying LRTP update schedules of the five planning partners in the region, this would not be possible (see **Table 4**).

A Congestion Management Process (CMP) is a document which a number of MPOs develop on a regular basis. CMPs are required in metropolitan areas with population exceeding 200,000. Similar to the ROP, these documents identify congested corridors and develop objectives-driven, performance-based recommendations for improvements. In the future, greater coordination between CMPs and the ROP update process is recommended. Identified CMP locations should be integrated into the issues/needs ROP analysis and could be added as a layer to One Map for easier collaboration. Currently each MPO has their own unique approach to the CMP. Greater consistency in process could help ease the integration of this effort into the ROP. Greater consistency between the ROP and CMPs in terms of methodology for identifying congested corridors would also be beneficial.

Additionally, in order to maximize the success of the ROP, further funding sources for TSMO projects should be pursued. Ideally, dedicated line items for TSMO funding and ITS maintenance would be added to the LRTP and TIP processes. Funding replacement of antiquated ITS devices via the Interstate TIP should be strongly considered as these devices provide important and cost-effective improvements to the interstate system.

TSMO should also be included within the project scoping checklist. This way, ROP projects can be incorporated into larger construction projects occurring in the areas recommended within this plan. To help ensure continuity of the recommendations included in this report, it is hoped that each of the region's partners will formally adopt this ROP and the recommendations included herein. Finally, the ITS projects recommended in this document should be considered for PennDOT's statewide Device Deployment Plan compiled each year.

Emerging Transportation Trends

Connected and autonomous vehicles were generally not accounted for within this report. Despite its ongoing presence in the news and the very real advancements occurring, too much remains unknown with the future of these technologies. As this plan is revisited for future updates, the issue of regional planning

for connected and autonomous vehicles should be examined again. Any guidance provided by PennDOT and other stakeholders should be incorporated into future updates of this document.

Another transportation trend not discussed in detail elsewhere in this plan is the rise of micromobility. This includes traditional bike share systems, but also emerging technology such as e-assist bicycles, electric scooters, and electric skateboards. Electric scooters in particular have seen a rapid rise in usage in other American cities though they are currently not allowed by law in Pennsylvania. In future ROP updates, these types of mobility options will likely need to be considered as the transportation environment and the laws guiding it evolve.

Finally, this document was compiled during the COVID-19 pandemic, which has greatly affected the transportation network just as it has so much of the rest of our day to day lives. Some of these changes will be temporary, but permanent alterations to commuting patterns, traffic volumes, and other transportation-related trends are expected. It is anticipated that many jobs will continue to be performed remotely which will soften the peaks of congestion. Reductions in vehicle miles traveled will also continue to affect funding for transportation infrastructure. The combination of reduced peak hour demand and reduced funding should lead to reconsideration of planned capacity-adding projects and provide more reason than ever for the focus to shift to cost-effective TSMO solutions, particularly multimodal improvements and Transportation Demand Management strategies.

Appendix A. Meeting Minutes

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Meeting Minutes

Agreement # / Name	**E03575 / Maintenance and Traffic Open End / Work Order 14**
Project	**Development of the Regional Operations Plans for the Eastern RTMC Region (D4, D5, and D8)**
Meeting Name	**Steering Committee Meeting #1**
Date / Time / Location	**11-06-2019 / 10:00 AM-12:00 PM / PEMA Building (Harrisburg)**
Attendees	**See Sign-in Sheet**

Meeting Purpose: Initial meeting of the project steering committee.

Meeting Minutes:	Action Items:
1. Welcome and Introductions • Pierce Sube welcomed everyone with some opening remarks and led a round of introductions. • The group discussed possible additions to the steering committee: o Pierce Sube noted that the Pennsylvania Turnpike Commission should be added. He will coordinate with Jacobs to ensure their participation. o The group discussed potentially adding a few planning partners. 1. Jeff Fuhr noted that Steve Pitoniak from Luzerne Lackawanna MPO might be interested. 2. Matt Clouser hopes that Tri-County RPC will be interested. 3. Derrick Herrmann reached out to LVPC but they were not interested.	➢ Pierce and Jacobs will coordinate to add Turnpike to steering committee. ➢ The group will gauge interest of planning partners in joining steering committee at first stakeholder meetings.
2. TSMO Overview • Steve Cunningham provided an overview of TSMO including its meaning and importance to PennDOT, application in Pennsylvania, and future plans. • Pierce noted that the application period for the next round of TSMO Capital Funding was just announced. • Pharon Bertsch noted there needs to be clearly defined goals/performance metrics for the identified projects (i.e. X% reduction in crashes or in incident response time).	
3. ROP Process Overview • Steve provided an overview of the ROP process including some background, strategy, outline, stakeholder involvement, and schedule. • Derrick asked about what types of transit projects could be considered. Adam Smith noted that the Western ROP included smart parking systems at	

transit parking sites and transit corridor projects which included Transit Signal Priority, dedicated bus lanes, queue jumps, and other improvements. • Pharon asked how the executive staff should get involved in the process. Pierce said that they are hopefully at the initial stakeholder meetings to show the importance of the project and get buy-in. They can also review the drafts of the report document.	
4. Regional Stakeholders Meetings – Round 1 • Adam provided an overview of the material to be presented at the first round of stakeholder meetings, including a discussion of TSMO Roadway Tiering, PennDOT One Map, and an example set of maps which will be reviewed during the stakeholder breakout sessions.	
5. Wrap Up / Next Steps • Adam discussed follow-up items and gave an overview of next steps. • Potential One Map training was discussed. Pierce said that the Program Center is planning District trainings. Jeff recommended sending out the user guide to potential users. Pierce also said he would look into a potential Skype training. • Adam asked about the region's ITS inventory. Matt noted that the best location for this information is TSAMS. • Adam noted Jacobs will also be inquiring about recently completed projects, planned infrastructure changes, and future land use changes in the region. • Jeff asked if the ROP can encompass broader needs beyond specific projects (i.e. TMC personnel needs). Pierce and Adam noted that more broad studies and initiatives can also be determined in the process. • The group discussed potential additions to the stakeholder groups. o Jeff asked if the I-81 Corridor Coalition should be included, which the group agreed with. o Adam will send out the stakeholder lists for each District to review. o Pierce noted it is helpful to have an RTMC champion who attends the stakeholder meetings in each District. • Adam noted that the next round of meetings is anticipated for late January/February.	➢ Pierce will look into scheduling a potential One Map Skype training. ➢ Jacobs will be reaching out to get feedback on recently completed transportation projects, planned infrastructure changes, and future land use changes in the region. ➢ Jacobs will distribute the stakeholder lists for each District to review. ➢ Jacobs will start scheduling the second round of meetings.

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Meeting Minutes

Agreement # / Name	**E03575 / Maintenance and Traffic Open End / Work Order 14**
Project	**Development of the Regional Operations Plans for the Eastern RTMC Region (D4, D5, and D8)**
Meeting Name	**D5 Stakeholder Meeting #1**
Date / Time / Location	**11-18-2019 / 1:00 PM-3:00 PM / PennDOT District 5-0**
Attendees	**See Sign-in Sheet**

Meeting Purpose: Initial meeting of the PennDOT District 5-0 stakeholder group.

Meeting Minutes:	Action Items:
1. Welcome and Introductions • Frank Cavataio welcomed everyone with some opening remarks and led a round of introductions. • Frank noted that this is a statewide effort, with the Central and Western documents being completed in the past year. The goal is to focus on what projects are needed to improve traffic operations.	
2. TSMO Overview • Steve Cunningham provided an overview of TSMO, including its meaning and importance to PennDOT, updates on progress, and future plans.	
3. ROP Process Overview • Steve Cunningham provided an overview of the ROP process including background, strategy, outline, stakeholder involvement, and schedule. • Steve noted that the Central and Western RTMC ROPs are available on the PennDOT TSMO website to reference as an example of what the final product of this process might look like.	
4. Previous ROP Overview • Adam Smith discussed the previous District 5 ROP, completed in 2007, including the regional needs and a brief summary of the status of the previously recommended projects.	
5. ROP Tools • Adam discussed the Roadway Tiering System and some of the top corridors in the District 5. • Adam also gave a brief overview of the PennDOT One Map tool and discussed the mapping to be used in the breakout sessions. • Scott Slingerland asked where the travel time information is taken from. It was discussed that this data is taken from probe speed data. • Mike Rebert led a discussion of the issues in finding	➢ TSMO One Map registration instructions included with this document.

funding for TSMO efforts. He mentioned it might be more appropriate to utilize the Interstate TIP for TSMO projects on the Interstates. He noted that the 50/50 match for TMSO Capital Funding is difficult to gain funding for. • Scott inquired if issues related to speeding can be determined in the One Map data. Adam noted that this data is not available through the site and mentioned that, while the focus of this effort is on operations, no projects should be recommended which would decrease safety of road users. It was also noted that PennDOT has a work zone speed enforcement initiative, including a pilot on I-78 (as well as the Turnpike).	
6. Breakout Sessions • Breakout sessions were held for each of the three planning organizations within the District. Maps were displayed showing congestion, crashes, roadway tiering, and planned events. • Comments from the sessions can be found on the attached maps.	
7. Wrap Up/Next Steps • The next round of stakeholder meetings will be scheduled to occur in February. • The Jacobs team will continue development of the ROP document.	➢ Jacobs will confirm availability of stakeholders and provide an invite for the next meeting.

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Meeting Minutes

Agreement # / Name	**E03575 / Maintenance and Traffic Open End / Work Order 14**
Project	**Development of the Regional Operations Plans for the Eastern RTMC Region (D4, D5, and D8)**
Meeting Name	**D8 County Maintenance Stakeholder Meeting**
Date / Time / Location	**11-19-2019 / 12:30 PM-2:00 PM / PennDOT District 8-0**
Attendees	**See Sign-in Sheet**

Meeting Purpose: Initial stakeholder meeting with District 8-0 County Maintenance Managers.

Meeting Minutes:	Action Items:
1. Welcome and Introductions • Jason Bewley welcomed everyone with some opening remarks and led a round of introductions.	
2. TSMO Overview • Steve Cunningham provided an overview of TSMO, including its meaning and importance to PennDOT, updates on progress, and future plans.	
3. ROP Process Overview • Steve Cunningham provided an overview of the ROP process including background, strategy, outline, stakeholder involvement, and schedule. • Steve noted that the Central and Western RTMC ROPs are available on the PennDOT TSMO website to reference as an example of what the final product of this process might look like.	
4. Breakout Sessions • Adam Smith provided a brief overview of the PennDOT One Map tool and discussed the mapping to be used in the breakout sessions. • Breakout sessions were held to discuss the operations issues and needs for the District. Maps were displayed showing congestion, crashes, roadway tiering, and planned events. • Comments from the sessions can be found on the attached maps.	
5. Wrap Up/Next Steps • The next round of stakeholder meetings will be scheduled to occur in February. • The Jacobs team will continue development of the ROP document.	➢ Jacobs will confirm availability of stakeholders and provide an invite for the next meeting.

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Meeting Minutes

Agreement # / Name	**E03575 / Maintenance and Traffic Open End / Work Order 14**
Project	**Development of the Regional Operations Plans for the Eastern RTMC Region (D4, D5, and D8)**
Meeting Name	**D8 Stakeholder Meeting #1**
Date / Time / Location	**12-19-2019 / 10:00 AM-12:00 PM / PennDOT District 8-0**
Attendees	**See Sign-in Sheet**

Meeting Purpose: Initial meeting of the PennDOT District 8-0 stakeholder group.

Meeting Minutes:	Action Items:
1. Welcome and Introductions • Jason Bewley welcomed everyone with some opening remarks and led a round of introductions.	
2. TSMO Overview • Steve Cunningham provided an overview of TSMO, including its meaning and importance to PennDOT, updates on progress, and future plans.	
3. ROP Process Overview • Steve Cunningham provided an overview of the ROP process including background, strategy, outline, stakeholder involvement, and schedule. • Steve Gault described the change from nine largely District-based ROPs in 2007 to four ROPs based around the RTMCs. • Steve Cunningham noted that there won't be a 12-year gap again between updates. Plan is to update every 2-4 years. Steve Gault noted that they'd like to integrate into long-range plan update process, but timing of those updates varies by planning partner.	
4. Previous ROP Overview • Adam Smith discussed the previous District 8 ROP, completed in 2007, including the regional needs and a brief summary of the status of the previously recommended projects.	
5. ROP Tools • Adam discussed the Roadway Tiering System and some of the top corridors in the District 5. • Steve Deck asked if the Interstate Committee had any involvement in ROP process? Steve Gault responded that Central Office coordinates with them and that they can look for ways to integrate them further in process in the future. Interstate Committee can use the ROP to identify potential projects. o Following the meeting, Steve Gault noted that	

Doug Tomlinson (Chief of Highway Safety & Traffic Operations) is on the committee and will ensure TSMO priorities from the ROP are considered and included. • Adam also gave a brief overview of the PennDOT One Map tool and discussed the mapping to be used in the breakout sessions. • Dan Walston asked how the ROP works with the Congestion Management Plan (CMP). Steve Gault noted that the CMP looks at current congestion conditions but less of a planning document than ROP which identifies and prioritizes projects for future. Will Clark brought up that it might make sense for the ROP to replace CMPs in the future. o Following the meeting, Steve Gault noted that, although there are similarities between ROP and CMP, these will likely need to remain separate documents since the geographic areas differ and the ROP may not satisfy all federal requirements for a CMP in non-attainment areas. Planning Partners preparing CMPs are encouraged to utilize strategies from the ROP and might consider aligning their CMP updates with the ROP update timeline in to allow both documents to feed projects into the LRTP. • While discussing the crash data used in the ROP, Will Clark noted it might make sense to use RCRS instead of CDART to identify crash locations which have the most delays attributed to them as opposed to just the highest crash rate.	➢ TSMO One Map registration instructions included with this document.
6. Breakout Sessions • Breakout sessions were held where maps were displayed showing congestion, crashes, roadway tiering, and planned events. The purpose of these sessions were to identify the key operations issues and needs within the District. • Comments from the sessions can be found on the attached maps.	
7. Wrap Up/Next Steps • The next D8 stakeholder meeting will be held on February 28. An Outlook event has been distributed. • The Jacobs team will continue development of the ROP document.	

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Meeting Minutes

Agreement # / Name	**E03575 / Maintenance and Traffic Open End / Work Order 14**
Project	**Development of the Regional Operations Plans for the Eastern RTMC Region (D4, D5, and D8)**
Meeting Name	**D4 Stakeholder Meeting #1**
Date / Time / Location	**01-13-2020 / 1:00 PM-3:00 PM / Lackawanna County Center for Public Safety**
Attendees	**See Sign-in Sheet**

Meeting Purpose: Initial meeting of the PennDOT District 4-0 stakeholder group.

Meeting Minutes:	Action Items:
1. Welcome and Introductions • Jeff Fuhr welcomed everyone with some opening remarks. • Steve Cunningham led a round of introductions. • Frank Cavataio provided a summary of Central Office's goals with the ROPs, noting it's similar to the TIP process but focused on operations. He noted they'd like to do major ROP updates every four years with interim updates every 2 years. They're also looking to determine a way to add projects between updates.	
2. TSMO Overview • Steve Cunningham provided an overview of TSMO, including its meaning and importance to PennDOT, updates on progress, and future plans.	
3. ROP Process Overview • Steve Cunningham provided an overview of the ROP process including background, strategy, outline, stakeholder involvement, and schedule. • Steve described the change from nine largely District-based ROPs in 2007 to four ROPs based around the RTMCs.	
4. Previous ROP Overview • Adam Smith discussed the previous District 4 ROP, completed in 2007, including the regional needs and a brief summary of the status of the previously recommended projects.	
5. ROP Tools • Adam discussed the Roadway Tiering System and some of the top corridors in the District 5. • Adam also gave a brief overview of the PennDOT One Map tool and discussed the mapping to be used in the breakout sessions. • Jeff Fuhr asked a question about how ROP projects are anticipated to be funded.	➢ TSMO One Map registration instructions included with this document.

o Frank Cavataio noted that a number of funding sources are available, depending on the type of project (TSMO Capital Funding Initiative, Green Light-Go, Interstate TIP, etc.). He also noted that operations projects will need to be on the TIP in order to get funded.	
6. Breakout Sessions • Breakout sessions were held where maps were displayed showing congestion, crashes, roadway tiering, and planned events. The purpose of these sessions was to identify the key operations issues and needs within the District. • Comments from the sessions can be found on the attached maps.	
7. Wrap Up/Next Steps • The next D4 stakeholder meeting will be held on February 12. An Outlook event has been distributed. • The Jacobs team will continue development of the ROP document.	

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Meeting Minutes

Agreement # / Name	**E03575 / Maintenance and Traffic Open End / Work Order 14**
Project	**Development of the Regional Operations Plans for the Eastern RTMC Region (D4, D5, and D8)**
Meeting Name	**Steering Committee Meeting #2**
Date / Time / Location	**01-22-2020 / 10:00 AM-12:00 PM / PEMA Building (Harrisburg)**
Attendees	**PennDOT Central Office – Frank Cavataio, Pierce Sube** **PennDOT District 4 – Dan Fox, Jeff Fuhr** **PennDOT District 5 – Derrick Herrmann, Jose Lopez-Rocha** **PennDOT District 8 – Pharon Bertsch, Matt Clouser, Marc Schmiedel** **Jacobs – Steve Cunningham, Adam Smith, Eric Sponsler**

Meeting Purpose: Second meeting of the project steering committee.

Meeting Minutes:	Action Items:
1. Welcome and Introductions • Adam Smith and Steve Cunningham provided a brief welcome and overview of items to cover.	
2. Progress Update • Steve reviewed progress to date, including an update on development of the ROP document. He also discussed the schedule. • Frank Cavataio noted that the schedule is flexible and document review times can be extended if Districts feel it is needed – don't want to rush the document. • Adam discussed the plan for releasing the 60% draft document. It was decided that it would be released to the steering committee initially for review, then revised and distributed to the stakeholder group for review. The goal is for the stakeholder group to receive the document in time to review before the third round of meetings.	
3. Stakeholder Meeting Planning • Steve discussed the TSMO strategies which will be reviewed at the second stakeholder meetings. • Matt Clouser mentioned that PennDOT has recently developed a number of congestion pie charts to complement the FHWA ones, including for statewide, each RTMC region, and each District. Matt provided these pie charts after the meeting and they will be used during the second round stakeholder meetings.	

4. Confirmation of Regional Issues and Needs • Adam provided an overview of the material to be presented at the second round of stakeholder meetings. • The group then split up by District and reviewed the breakout maps to determine the key regional issues and needs to highlight for the second round of stakeholder meetings. • This information will be used to compile the maps for the next stakeholder breakout sessions. These maps will be shared with the steering committee prior to each stakeholder meeting for review.	➢ Jacobs will provide the stakeholder issues and needs maps to the steering committee for review prior to the next round of stakeholder meetings.
5. Wrap Up / Next Steps • Adam discussed follow-up items and gave an overview of next steps. • Potential One Map training was discussed. Pierce said that One Map version 2 is coming soon. He will check on timing, but training should probably wait until after new version is out. • Frank mentioned the previously discussed idea of including some MPO/RPO members in the steering committee (representative from each District?). Districts have reached out, but interest was not there from planning partners. Team will revisit to see if planning partners are interested in attending subsequent steering meetings. • Frank discussed the prioritization methods from the previous ROPs, more analytical for Central and more qualitative for the Western. The team agreed that the sticker dot voting system from the Western ROP would be used for the Eastern ROP as well. • There was a discussion of how ROP updates would be handled. Frank noted that the steering committee would reconvene as necessary for interim updates when projects need to be considered for addition to the ROP. District would prepare request for Central Office/steering committee review. • Frank noted that the RTMC should have representation at all District stakeholder meetings. • Matt asked if before/after data for ROP projects will be tracked. Frank said this is something they are working on and anticipate including an approach to it in Part III of the TSMO Guidebook.	➢ Jacobs will start scheduling the third round of meetings. ➢ Pierce will look into timing of One Map version 2 update. ➢ District steering members will reach out again to planning partners. ➢ Jacobs will add a slide to the stakeholder presentation to discuss this process.

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Meeting Minutes

Agreement # / Name	**E03575 / Maintenance and Traffic Open End / Work Order 14**
Project	**Development of the Regional Operations Plans for the Eastern RTMC Region (D4, D5, and D8)**
Meeting Name	**D4 Stakeholder Meeting #2**
Date / Time / Location	**02-12-2020 / 1:00 PM-3:00 PM / Lackawanna County Center for Public Safety**
Attendees	**See Sign-in Sheet**

Meeting Purpose: Second meeting of the PennDOT District 4-0 stakeholder group.

Meeting Minutes:	Action Items:
1. Welcome and Introductions • Jeff Fuhr welcomed everyone and provided a summary of the project goals. • Steve Cunningham led a round of introductions and discussed the goals for the meeting.	
2. Progress Update • Steve recapped highlights from the previous stakeholder meeting, noted progress on the ROP document, and reviewed the project schedule.	
3. Tools/Strategies in TSMO Guidebook • Steve provided an overview of tools and strategies provided in the TSMO Guidebook, noting how they may be applied to the operations issues and needs to develop projects for the ROP. • John Pfeiffer asked for more information about how the PennDOT TSMO congestion data was compiled. David Gaffney noted that this information was recently released and that Central Office would follow up with more background on how the types of congestion were calculated.	
4. Regional Operations Issues and Needs • Adam Smith provided a brief summary of the various regional issues and needs determined through the previous stakeholder meeting. • Regional needs include: o Traffic signal improvements on major arterials o Integrated Corridor Management on Interstates and parallel corridors/detour routes o ITS device deployments on major routes o Crash prevention ITS devices at problem locations o Transit and bike network improvements to encourage mode change • Tom Pichiarella asked about how the ROP projects would be funded. Steve noted the TSMO Funding	

Initiative, Green Light-Go, and other funding sources. The Interstate TIP can also be used for projects related to the Interstate system.	
5. Breakout Sessions • Breakout sessions were held for each of the three planning organizations within the District. Maps were displayed showing the confirmed issues and needs locations. • The maps with stakeholder comments will be scanned and distributed when feasible.	
6. Wrap Up/Next Steps • The next D4 stakeholder meeting will be held in May. A Doodle poll will be distributed to confirm a date. o This meeting has now been scheduled for May 12. o Due to the current pandemic, this meeting will likely be shifted online. Please hold the meeting date and look for more information from the project team. • The Jacobs team will continue development of the ROP document. • Frank Cavataio noted the importance of identifying TSMO projects through the ROP so that the document can be used to prioritize funding. In the future, the hope is for TSMO projects to be funded, they must be on the region's ROP. He also noted that they will be determining procedures for adding projects to the ROPs between updates.	

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Meeting Minutes

Agreement # / Name	**E03575 / Maintenance and Traffic Open End / Work Order 14**
Project	**Development of the Regional Operations Plans for the Eastern RTMC Region (D4, D5, and D8)**
Meeting Name	**D5 Stakeholder Meeting #2**
Date / Time / Location	**02-25-2020 / 1:00 PM-3:00 PM / PennDOT District 5-0**
Attendees	**See Sign-in Sheet**

Meeting Purpose: Second meeting of the PennDOT District 5-0 stakeholder group.

Meeting Minutes:	Action Items:
1. Welcome and Introductions • Steve Cunningham welcomed everyone, led a round of introductions, and discussed the goals for the meeting.	
2. Progress Update • Steve recapped highlights from the previous stakeholder meeting, noted progress on the ROP document, and reviewed the project schedule.	
3. Tools/Strategies in TSMO Guidebook • Steve provided an overview of tools and strategies provided in the TSMO Guidebook, noting how they may be applied to the operations issues and needs to develop projects for the ROP.	
4. Regional Operations Issues and Needs • Adam Smith provided a brief summary of the various regional issues and needs determined through the previous stakeholder meeting. • Regional needs include: o Traffic signal improvements on major arterials o Integrated Corridor Management on Interstates and parallel corridors/detour routes o ITS device deployments on major routes o Crash prevention ITS devices at problem locations o Transit and bike network improvements to encourage mode change • Steve Gault noted the importance of identifying TSMO projects through the ROP so that the document can be used to prioritize funding.	
5. Breakout Sessions • Breakout sessions were held for each of the three planning organizations within the District. Maps were displayed showing the confirmed issues and needs locations.	

• The maps with stakeholder comments will be scanned and distributed when feasible.	
6. Wrap Up/Next Steps • The next D5 stakeholder meeting will be held in May. A Doodle poll will be distributed to confirm a date. o This meeting has now been scheduled for May 18. o Due to the current pandemic, this meeting will likely be shifted online. Please hold the meeting date and look for more information from the project team. • The Jacobs team will continue development of the ROP document.	

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Meeting Minutes

Agreement # / Name	**E03575 / Maintenance and Traffic Open End / Work Order 14**
Project	**Development of the Regional Operations Plans for the Eastern RTMC Region (D4, D5, and D8)**
Meeting Name	**D8 Stakeholder Meeting #2**
Date / Time / Location	**02-28-2020 / 10:00 AM-12:00 PM / PennDOT District 8-0**
Attendees	**See Sign-in Sheet**

Meeting Purpose: Second meeting of the PennDOT District 8-0 stakeholder group.

Meeting Minutes:	Action Items:
1. Welcome and Introductions • Jason Bewley welcomed everyone and provided a brief introduction. • Steve Cunningham led a round of introductions and discussed the goals for the meeting.	
2. Progress Update • Steve recapped highlights from the previous stakeholder meeting, noted progress on the ROP document, and reviewed the project schedule.	
3. Tools/Strategies in TSMO Guidebook • Steve provided an overview of tools and strategies provided in the TSMO Guidebook, noting how they may be applied to the operations issues and needs to develop projects for the ROP.	
4. Regional Operations Issues and Needs • Adam Smith provided a brief summary of the various regional issues and needs determined through the previous stakeholder meeting. • Regional needs include: o Traffic signal improvements on major arterials o Integrated Corridor Management on Interstates and parallel corridors/detour routes o ITS device deployments on major routes o Crash prevention ITS devices at problem locations o Transit and bike network improvements to encourage mode change	
5. Breakout Sessions • Breakout sessions were held for each of the three planning organizations within the District. Maps were displayed showing the confirmed issues and needs locations.	

• The maps with stakeholder comments will be scanned and distributed when feasible.	
6. Wrap Up/Next Steps • The next D8 stakeholder meeting will be held in May. A Doodle poll will be distributed to confirm a date. o The meeting has now been scheduled for May 13. o Due to the current pandemic, this meeting will likely be shifted online. Please hold the meeting date and look for more information from the project team. • The Jacobs team will continue development of the ROP document.	

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Meeting Minutes

Agreement # / Name	**E03575 / Maintenance and Traffic Open End / Work Order 14**
Project	**Development of the Regional Operations Plans for the Eastern RTMC Region (D4, D5, and D8)**
Meeting Name	**Steering Committee Meeting #3**
Date / Time / Location	**04-16-2020 / 10:00 AM-12:00 PM / Skype Meeting**
Attendees	**PennDOT Central Office – Frank Cavataio, Pierce Sube, Steve Gault, David Gaffney** **PennDOT District 4 – Dan Fox, Jeff Fuhr** **PennDOT District 5 – Derrick Herrmann, Jose Lopez-Rocha, Anthony Tomczak** **PennDOT District 8 – Chris Flad, Matt Clouser, Marc Schmiedel, Eric Kinard** **Jacobs – Steve Cunningham, Adam Smith, Eric Sponsler**

Meeting Purpose: Third meeting of the project steering committee.

Meeting Minutes:	Action Items:
1. Welcome • Frank Cavataio welcomed the group and noted the uncertainty of when we'll be able to hold in-person meetings again. Despite this, we will continue to progress this effort and plan on holding the next stakeholder meetings online.	
2. Progress Update • Adam Smith gave a brief update on project progress, noting that the Jacobs team incorporated stakeholder feedback from the last round of meetings, developed project maps, and distributed the 60% draft to the steering committee. • Pierce Sube discussed a slight schedule change – project activities after the completion of the final stakeholder meetings will need to push to FY2021, so the project will pick back up in July.	

3. 60% Draft Review • Adam noted that steering committee comments have been received and are being integrated into a revised 60% draft which will be distributed to stakeholders by Friday, April 24 for review and comment. • The group discussed the best way to incorporate Park and Ride lots into the summary of the regional transit network. o Adam noted the available resources – PennDOT's statewide Park and Ride Map and a map from Commuter Services. o Steve Gault provided a link to PennDOT's Open Data website which has a Park and Ride GIS file. • The group discussed including the I-81 Corridor Coalition in the stakeholder process. o Eric Sponsler and Matt Clouser noted that Dan Whetzel and Monica Wesner are involved in the Coalition. o Adam also noted that we will continue to coordinate I-81 ROP efforts with the ongoing I-81 Improvement Strategy project. • The group discussed how to integrate Green Light-Go projects into ROP. o Decided that projects which are funded should be included in the Planned Infrastructure Changes section of Chapter 3, while projects that are submitted but not awarded should be shown as needs in Chapter 4.	➢ Jacobs will distribute the 60% draft to stakeholders by Friday, April 24. ➢ Jacobs will develop an Eastern Region Park and Ride map from the GIS file for inclusion in the ROP document. ➢ Jacobs will coordinate to ensure Dan and/or Monica are included in stakeholder efforts and review the ROP document on behalf of the I-81 Corridor Coalition. ➢ Steve Gault will provide list of pending GLG projects and extract TSAMS data for use in the ROP document.
4. Stakeholder Meeting Approach • Adam noted that the final stakeholder meetings will be held on the confirmed dates, but shifted online to MS Teams • As a test run, the next biweekly status meeting will be switched over from Skype to Teams • Adam discussed the meeting approach, which will include distributing project maps to stakeholders at least one week prior to meetings for review. After the meetings, any map revisions will be completed and then the maps will be redistributed, along with a spreadsheet of the projects. Stakeholders will be asked to rank their top 10 project priorities. Jacobs will use this ranking data to determine a draft of project prioritization, to be confirmed with steering committee.	➢ Adam will setup Teams meeting to replace current status meeting on April 29.

5. Draft Project Maps • Adam noted that the steering committee can provide input on the maps through the end of April, before they are distributed to the stakeholder group. • Chris Flad noted that the leader line color should be changed for clarity as it currently blends with other map lines. He also noted that any changes to ROP document should be reflected on maps. • The group discussed how to include freight efforts, including a potential Truck Parking Study and Winter Truck Restrictions Study. o Frank stated that these can be called out as regional studies which could be integrated into statewide efforts later if needed. • The group discussed how to include TMC improvements in ROP. o Derrick Herrmann discussed staffing needs for handling of command/control signal systems and other ITS expansion. o The group decided that a discussion of nee for staffing should be included as part of Chapter 6, but no specific process for determining staffing needs. o Frank noted that the TSMO Program Plan is due to be updated so a discussion of plan for identifying and addressing TMC staffing needs could be provided in that update. • The group discussed how to integrate interstate proposed ITS device lists into ROP. o Projects identified in Strategic Mobility Plan C (SMP C) should be included in ROP. ROP should reference the statewide list maintained by PennDOT's Highway Safety and Traffic Operations Division.	➢ Jacobs will revise leader lines on maps and integrate any changes to ROP projects into maps. ➢ Frank will provide statewide ITS project list from SMP C to group for inclusion in ROP.
6. Wrap Up / Next Steps • The group discussed a few ideas/concerns provided by Will Clark at York MPO. o Decided that Chapter 6 should include discussion of improving performance measure tracking for projects. o Adam noted that ROP project summary sheets note potential performance measures for each project. • Adam noted that Jacobs will continue to develop ROP document and prepare meeting materials for final stakeholder meetings in May. • At this time, it is anticipated that the final steering meeting will occur in July-August timeframe.	

pennsylvania
DEPARTMENT OF TRANSPORTATION

Meeting Minutes

Agreement # / Name	**E03575 / Maintenance and Traffic Open End / Work Order 14**
Project	**Development of the Regional Operations Plans for the Eastern RTMC Region (D4, D5, and D8)**
Meeting Name	**D4 Stakeholder Meeting #3**
Date / Time / Location	**05-12-2020 / 1:30 PM-3:00 PM / Microsoft Teams**
Attendees	**See meeting recording**

Meeting Purpose: Final meeting of the PennDOT District 4-0 stakeholder group.

Meeting Minutes:	Action Items:
1. Welcome and Introductions • Jeff Fuhr welcomed everyone and provided a summary of the project goals. • Steve Cunningham led a round of introductions and discussed the goals for the meeting.	
2. Progress Update • Steve Cunningham reviewed the project schedule and discussed the anticipated plan for the remainder of the project.	
3. ROP Document • Adam Smith discussed the review of the 60% document and provided an overview of the items which will be added for the 100% draft. • Adam mentioned comments related to showing non-PennDOT Park & Ride locations in the Park & Ride map in the ROP document. • The group discussed whether the Regional Attractions table should be reduced to just show the locations that are most impactful to transportation operations or expand to include additions provided in the stakeholder review. o Steve Pitoniak noted that, since the data has been collected, it should be kept in. Jeff Fuhr concurred with this approach. o Jeff Fuhr also noted it might be helpful to provide which District the various colleges/universities are in.	➢ If stakeholders have data on other Park & Ride locations which should be shown, please provide to Adam.
4. Project Maps and Prioritization • Adam reviewed each of the project maps for the District. o Jeff noted that PennDOT is currently working with the PA Turnpike on displaying travel times for I-81 vs. Northeast Extension o Steve Pitoniak noted that Lackawanna/Luzerne MPO has begun conversations with	

FWHA/PennDOT/PA Turnpike on starting TIM Team covering I-81/I-84/I-380, US 6, and Northeast Extension • Adam reviewed the project prioritization which will be used now that it must be done remotely. Revised project maps and a spreadsheet will be included with these minutes. Stakeholder organizations can review the documents and provide their top 10 priorities within the spreadsheet.	
5. Wrap Up/Next Steps • Adam discussed the anticipated schedule for future updates of the ROP and the importance of planning partners adopting the document. o Kate McMahon asked what the timeframe is for MPOs to adopt the ROP. o Frank Cavataio discussed the potential process for ROP adoption and noted there is no specific timeframe, but it is encouraged. PennDOT could be available to present the ROP to MPOs as needed. • The Jacobs team will continue development of the ROP document.	

pennsylvania
DEPARTMENT OF TRANSPORTATION

Meeting Minutes

Agreement # / Name	**E03575 / Maintenance and Traffic Open End / Work Order 14**
Project	**Development of the Regional Operations Plans for the Eastern RTMC Region (D4, D5, and D8)**
Meeting Name	**D8 Stakeholder Meeting #3**
Date / Time / Location	**05-13-2020 / 1:00 PM-2:30 PM / Microsoft Teams**
Attendees	**See meeting recording**

Meeting Purpose: Final meeting of the PennDOT District 8-0 stakeholder group.

Meeting Minutes:	Action Items:
1. Welcome and Introductions • Steve Cunningham welcomed everyone and provided a summary of the project goals. • Steve led a round of introductions and discussed the goals for the meeting.	
2. Progress Update • Steve reviewed the project schedule and discussed the anticipated plan for the remainder of the project.	
3. ROP Document • Adam Smith discussed the review of the 60% document and provided an overview of the items which will be added for the 100% draft. • Adam mentioned comments related to showing non-PennDOT Park & Ride locations in the Park & Ride map in the ROP document. o Matt Boyer noted that the Commuter Services website provides some Park & Ride information (www.pacommuterservices.org) o DeRon Jordan noted there might be some additional lots in the Harrisburg area. Subsequent to the meeting, he provided a file with this information. o Lauri Ahlskog noted Lancaster has a number of unofficial Park & Ride lots. She will provide GIS data. • Adam mentioned that a few comments related to integration between the ROP and the Congestion Management Process. o Steve Deck asked if the ROP is expected to be statics or could it be easily amended as CMPs are updated? o Adam discussed the ROP is anticipated to be updated on a regular schedule, and that the steering committee would potentially be maintained so that they can reconvene and discuss revisions/additions as needed.	➢ If stakeholders have data on other Park & Ride locations which should be shown, please provide to Adam.

4. Project Maps and Prioritization • Adam reviewed each of the project maps for the District. o Steve Deck noted that the I-81 Corridor Study is ongoing. It can be referenced in the ROP I-81 ICM project. o Will Clark asked about adding TSMO aspects of I-83 North York project. • Matt Clouser noted that TSMO aspects of project should be noted as needs. • Marc Schmiedel asked if this means that I-83 Beltway TSMO improvements should also be included. • Steve Cunningham stated that this can be reviewed further with the steering group. • Chris Flad noted it is important to state TSMO items in case project scopes change and the TSMO items must become standalone projects. o Will also noted it would be helpful to share issues/projects from other breakout groups/Districts earlier in process so that stakeholders can gain better understanding of possibilities. • Adam reviewed the project prioritization which will be used now that it must be done remotely. Revised project maps and a spreadsheet will be included with these minutes. Stakeholder organizations can review the documents and provide their top 10 priorities within the spreadsheet. o Steve Deck asked if the general projects should be broken up for ranking into individual components/locations or remain grouped as shown in maps. • Adam stated they should remain grouped up. These are the current best estimate of potential project scopes and can be split up later as needed.	
5. Wrap Up/Next Steps • Adam discussed the anticipated schedule for future updates of the ROP and the importance of planning partners adopting the document. o Steve Deck asked what the timeframe is for MPOs to adopt the ROP. o Frank Cavataio discussed the potential process for ROP adoption and noted there is no specific timeframe, but it is encouraged. PennDOT could be available to present the ROP to MPOs	

as needed. • The Jacobs team will continue development of the ROP document. • Jason Bewley provided closing remarks about the importance of the ROP and operations planning.	

pennsylvania
DEPARTMENT OF TRANSPORTATION

Meeting Minutes

Agreement # / Name	**E03575 / Maintenance and Traffic Open End / Work Order 14**
Project	**Development of the Regional Operations Plans for the Eastern RTMC Region (D4, D5, and D8)**
Meeting Name	**D5 Stakeholder Meeting #3**
Date / Time / Location	**05-18-2020 / 10:00 AM-11:30 AM / Microsoft Teams**
Attendees	**See meeting recording**

Meeting Purpose: Final meeting of the PennDOT District 5-0 stakeholder group.

Meeting Minutes:	Action Items:
1. Welcome and Introductions • Steve Cunningham welcomed everyone and provided a summary of the project goals. • Steve led a round of introductions and discussed the goals for the meeting.	
2. Progress Update • Steve reviewed the project schedule and discussed the anticipated plan for the remainder of the project.	
3. ROP Document • Adam Smith discussed the review of the 60% document and provided an overview of the items which will be added for the 100% draft. • Adam mentioned comments related to showing non-PennDOT Park & Ride locations in the Park & Ride map in the ROP document.	➢ If stakeholders have data on other Park & Ride locations which should be shown, please provide to Adam.
4. Project Maps and Prioritization • Adam reviewed each of the project maps for the District. o Alan and Mike from Reading MPO provided comments on the projects in their region, including: • CCTV is needed at US 422 split with Business 422 east of Reading – add to Berks ITS project. • I-176 ramp metering project can be removed – revisions to I-176 ramp included in draft TIP. • Downtown Reading Signal Improvements – should include full 65 signal system. There is a current signal project with minor improvements, but more is needed. • Remove Outlets Event Management	

Study – no longer major issue. • US 222/US 422 Curve Warning project – issue in both directions of 422. Also, similar rollover issue where 222 merges with Bus. 222 north of Reading • Extend Sinking Spring signal project to the east. Also, upcoming projects to improve skewed intersections in Sinking Spring – convert to traditional 4-ways. • Additional CCTV need on PA-12 at PA-183. • Noted US 222 construction will add SB DMS in Maidencreek Township. • Noted need to coordinate ITS on PA-100 with Lehigh Valley and PennDOT D-6 – growing truck traffic on corridor. • o Kevin Kalman noted a potential Lehigh Valley TIM meeting was postponed due to pandemic. Looking to reschedule in July. • Adam reviewed the project prioritization which will be used now that it must be done remotely. Revised project maps and a spreadsheet will be included with these minutes. Stakeholder organizations can review the documents and provide their top 10 priorities within the spreadsheet.	
5. Wrap Up/Next Steps • Adam discussed the anticipated schedule for future updates of the ROP and the importance of planning partners adopting the document. o Frank Cavataio discussed the potential process for ROP adoption and noted there is no specific timeframe, but it is encouraged. PennDOT could be available to present the ROP to MPOs as needed. • The Jacobs team will continue development of the ROP document.	

Appendix B. Project Maps

DISTRICT 4 - LUZERNE & LACKAWANNA COUNTY

ROP PROJECTS

Eastern Region Truck Parking Study

I-81/Northeast Extension Travel Times
Coordination with PTC
DMS with travel time messaging
I-81, Northeast Extension

Wilkes-Barre/Scranton TIM Team
I-81 + parallel corridors, I-84, I-380, US 6, Northeast Extension

Wilkes-Barre/Scranton Freeway Service Patrol
I-81 + parallel corridors

Davis St. Signal Improvements
SR 3016
ATSPM

District 4-0 ITS Gaps
Type A DMS prior to I-81 for special events at Montage Mountain

I-81 (Wilkes-Barre/Scranton) ICM
US 11/PA-315 Signal Improvements
Queue Detection
CCTV
DMS
Ramp Metering for River St. on-ramps
Flex lanes - Moosic to Dunmore
Transit improvements

Wilkes-Barre Signal Improvements
Pennsylvania Ave + Wilkes Barre Blvd
Equipment upgrades
Retiming
Coordination

District 4-0 ITS Gaps
PA-309, near Mountain Top
Type A DMS

Church St. Signal Improvements
PA-309, Hazleton
Retiming
Coordination

PA-924 Ramp Preemption
I-81 Ramps at Can Do Expy

LEGEND

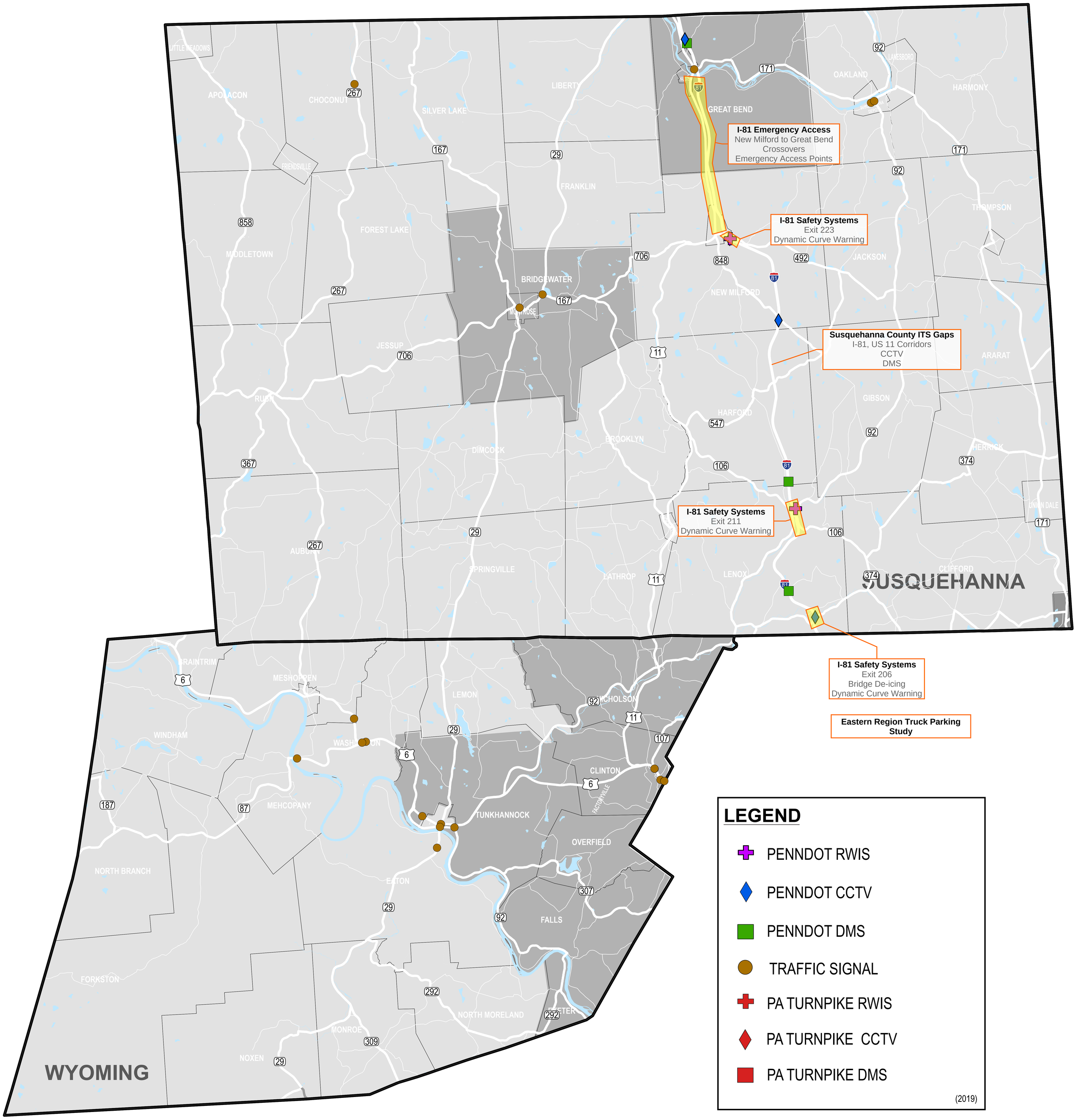
- PENNDOT RWIS
- PENNDOT CCTV
- PENNDOT DMS
- TRAFFIC SIGNAL
- PA TURNPIKE RWIS
- PA TURNPIKE CCTV
- PA TURNPIKE DMS

(2019)

N

0 2.75 5.5 11 Miles

DISTRICT 4
NORTHERN TIER RPO
ROP PROJECTS



DISTRICT 4
WAYNE / PIKE COUNTY
ROP PROJECTS

LEGEND

- PENNDOT RWIS
- PENNDOT CCTV
- PENNDOT DMS
- TRAFFIC SIGNAL
- PA TURNPIKE RWIS
- PA TURNPIKE CCTV
- PA TURNPIKE DMS

(2019)

I-84 Corridor ITS
CCTV
DMS
RWIS

I-84 Corridor ITS
CCTV

I-84 Corridor ITS
Other locations
TBD

Milford Operations Improvements
TBD

Eastern Region Truck Parking Study

0 2.5 5 10 Miles

N

DISTRICT 5
BERKS COUNTY PLANNING COMMISSION
ROP PROJECTS

DMS Interstate Approach Gaps (13 Type A)
I-78, MM 45 (both approaches)
I-78, MM 40 (both approaches)
I-380, MM 7 (NB PA-611)
I-78, MM 10
I-80, MM 305 (NB PA-209)
I-80, MM 304 (NB PA-209)
I-80, MM 302A/B (NB PA-33)
I-80, MM 274 (both approaches)
I-80, MM 284 (both approaches)

DMS Gaps
I-81 NB, MM 104-107
I-81 NB, MM 111
I-81 NB, MM 122-123
I-81 SB, MM 108
I-81 SB, MM 117
I-78 EB, Exit 19 and Exit 23
I-78 WB, MM 37
I-78 EB, 54-58
I-78 WB, MM 63
I-78 EB, MM 72
I-176 SB, MM 10.5 (replace HAB)
I-176 NB, MM 8

Replace Existing Portable CMS
I-81, MM 91.5, 113 SB, 130 NB
I-80, MM 290.5 EB
I-380, MM 1.4 NB, 13.5 SB
PA 61 NB/SB at I-78
I-78, MM 14-22 (2 signs)

CCTV Digital Retrofit
30 cameras, District-wide

CCTV Gaps
I-81, MM 100, 104, 112, 116, 131, 138
I-78, MM 13, 16, 17, 23, 29, 38, 43, 45, 47.9, 59, 63, 65, 68, 70, 74
I-176, MM 2, 5, 7, 9, 10
I-80, MM 284, 295, 297, 300.5
I-380, MM 7, 13

Berks ITS
I-78, MM 38
RWIS

US 222 Corridor ITS
CCTV
DMS
Locations TBD

Berks ITS
Retrofit VMS 5 to full-color DMS

Berks ITS
PA-12 at River Rd.
CCTV

US 222/US 422 Curve Warning
US 222 NB ramp at Bus. US 222

Berks ITS
PA-12 at PA-183
CCTV

US 222/US 422 Curve Warning
US 222 ramps at US 422 interchange

Boyertown Signal Improvements
PA-73
Equipment upgrades
Retiming

Berks ITS
PA-100, Boyertown
CCTV
DMS

Wernersville-Wyomissing Signal Improvements
US 422
Equipment upgrades
Retiming

Downtown Reading Signal Improvements
Equipment upgrades
Retiming
ATSPM
Transit Signal Priority

Berks ITS
US 422 WB, east of Bus. US 422 split
DMS
CCTV

Berks ITS
Between Mohns Hill Rd. and Bus. US 222
CCTV

Reading TIM Team
I-78 and Reading area

Berks Freeway Service Patrols
Expand hours
Extend coverage to US 222

Eastern Region Truck Parking Study

LEGEND

- PENNDOT RWIS
- PENNDOT CCTV
- PENNDOT DMS
- TRAFFIC SIGNAL
- PA TURNPIKE RWIS
- PA TURNPIKE CCTV
- PA TURNPIKE DMS

(2019)

DISTRICT 5 - LEHIGH VALLEY PLANNING COMMISSION

ROP PROJECTS

DMS Interstate Approach Gaps (13 Type A)
I-78, MM 45 (both approaches)
I-78, MM 40 (both approaches)
I-380, MM 7 (NB PA-611)
I-78, MM 10
I-80, MM 305 (NB PA-209)
I-80, MM 304 (NB PA-209)
I-80, MM 302A/B (NB PA-33)
I-80, MM 274 (both approaches)
I-80, MM 284 (both approaches)

CCTV Digital Retrofit
30 cameras, District-wide

DMS Gaps
I-81 NB, MM 104-107
I-81 NB, MM 111
I-81 NB, MM 122-123
I-81 SB, MM 108
I-81 SB, MM 117
I-78 EB, Exit 19 and Exit 23
I-78 WB, MM 37
I-78 EB, 54-58
I-78 WB, MM 63
I-78 EB, MM 72
I-176 SB, MM 10.5 (replace HAB)
I-176 NB, MM 8

CCTV Gaps
I-81, MM 100, 104, 112, 116, 131, 138
I-78, MM 13, 16, 17, 23, 29, 38, 43, 45, 47.9, 59, 63, 65, 68, 70, 74
I-176, MM 2, 5, 7, 9, 10
I-80, MM 284, 295, 297, 300.5
I-380, MM 7, 13

US 22/I-78 ICM
CCTV
DMS
Travel time comparisons
Parallel corridor signal improvements
Variable Speed Limits
Queue Detection
Flex Lanes - I-78 WB, Exits 67-71
Fiber network - I-78, US 22, PA-33

Lehigh Valley Freeway Service Patrols
Expand hours/# of trucks
Expand coverage to PA-33

Lehigh Valley TIM Team

Lehigh Valley Bike Share

LVPC Walk/Roll Bicycle Commuting Corridors
Hamilton St (Ott St to Sixth St)
Liberty St (Cedar Crest Blvd to 4th St)
Hamilton St/Hanover Ave (Sixth St to Eaton Ave)

LVPC Walk/Roll Catalytic Projects
D&L National Heritage Corridor
7th St/MacArthur Rd Multimodal Improvements
Complete Broad Street

D5 TMC Upgrades
Need individual adjustable workstations

Eastern Region Truck Parking Study

PA-329 Signal Improvements
ATSPM

LANTA Enhanced Bus Service
Prioritize transit on EBS routes
Transit Signal Priority
Bus lanes/queue jumps/etc.

LANTA Enhanced Bus Service
Park-n-Ride

Tilghman St Signal Improvements
Command/control
ATSPM

Hill to Hill Bridge Signal Improvements
PA-378
Command/control
ATSPM

Emmaus Ave. Signal Improvements
Equipment upgrades
Retiming

LANTA Enhanced Bus Service
Park-n-Ride

PA-100 Signal Improvements
Command/control
ATSPM
Pedestrian improvements

US 222 Signal Improvements
Command/control
ATSPM
Equipment upgrades?
Pedestrian improvements
Bus on Shoulder?

Wescosville Park & Ride Improvements
Capacity expansion
Smart Parking system

US 22/I-78 ICM
Permanent SB DMS

US 22/I-78 ICM
Permanent EB DMS

US 22/I-78 ICM
EB DMS

LANTA Enhanced Bus Service
Park-n-Ride

Downtown Easton Signal Improvements
PA-248 (Northampton St.), 3rd St.
ATSPM
Transit Signal Priority

LEGEND

- PENNDOT RWIS
- PENNDOT CCTV
- PENNDOT DMS
- TRAFFIC SIGNAL
- PA TURNPIKE RWIS
- PA TURNPIKE CCTV
- PA TURNPIKE DMS

(2019)

N

0 1.5 3 6 Miles

DISTRICT 5 - NEPA MPO
(MONROE/CARBON/SCHUYLKILL COUNTIES)
ROP PROJECTS

LEGEND

- PENNDOT RWIS
- PENNDOT CCTV
- PENNDOT DMS
- TRAFFIC SIGNAL
- PA TURNPIKE RWIS
- PA TURNPIKE CCTV
- PA TURNPIKE DMS

(2019)

I-80 (Monroe) ITS
I-80/I-380 Interchange
Junction Control

District 5-0 Curve Warning
I-80/I-380 interchange ramp approaches

I-80 (Monroe) ITS
I-380 to NJ
CCTV
DMS
Variable Speed Limits
PA-611 Traffic Signal Improvements

I-80 (Monroe) ITS
Martz Park & Ride
Expand capacity
Improve transit service

District 5-0 Curve Warning
I-80, MM 247-277

I-80 (Monroe) ITS
East Stroudsburg
Ramp Metering

I-80 (Monroe) ITS
DMS on I-80 at PA-611

Jim Thorpe Operations Improvements
TBD

Tamaqua Signal Improvements
PA-309
ATSPM

Palmerton Signal Improvements
SR 2002 (Delaware Ave)
Equipment upgrades
Retiming

District 5-0 Curve Warning
I-81, near MM 108

Cressona Signal Improvements
PA-183
Equipment upgrades
Retiming

DMS Interstate Approach Gaps (13 Type A)
I-78, MM 45 (both approaches)
I-78, MM 40 (both approaches)
I-380, MM 7 (NB PA-611)
I-78, MM 10
I-80, MM 305 (NB PA-209)
I-80, MM 304 (NB PA-209)
I-80, MM 302A/B (NB PA-33)
I-80, MM 274 (both approaches)
I-80, MM 284 (both approaches)

DMS Gaps
I-81 NB, MM 104-107
I-81 NB, MM 111
I-81 NB, MM 122-123
I-81 SB, MM 108
I-81 SB, MM 117
I-78 EB, Exit 19 and Exit 23
I-78 WB, MM 37
I-78 EB, 54-58
I-78 WB, MM 63
I-78 EB, MM 72
I-176 SB, MM 10.5 (replace HAB)
I-176 NB, MM 8

CCTV Gaps
I-81, MM 100, 104, 112, 116, 131, 138
I-78, MM 13, 16, 17, 23, 29, 38, 43, 45, 47.9, 59, 63, 65, 68, 70, 74
I-176, MM 2, 5, 7, 9, 10
I-80, MM 284, 295, 297, 300.5
I-380, MM 7, 13

Replace Existing Portable CMS
I-81, MM 91.5, 113 SB, 130 NB
I-80, MM 290.5 EB
I-380, MM 1.4 NB, 13.5 SB
PA 61 NB/SB at I-78
I-78, MM 14-22 (2 signs)

CCTV Digital Retrofit
30 cameras, District-wide

Eastern Region Truck Parking Study

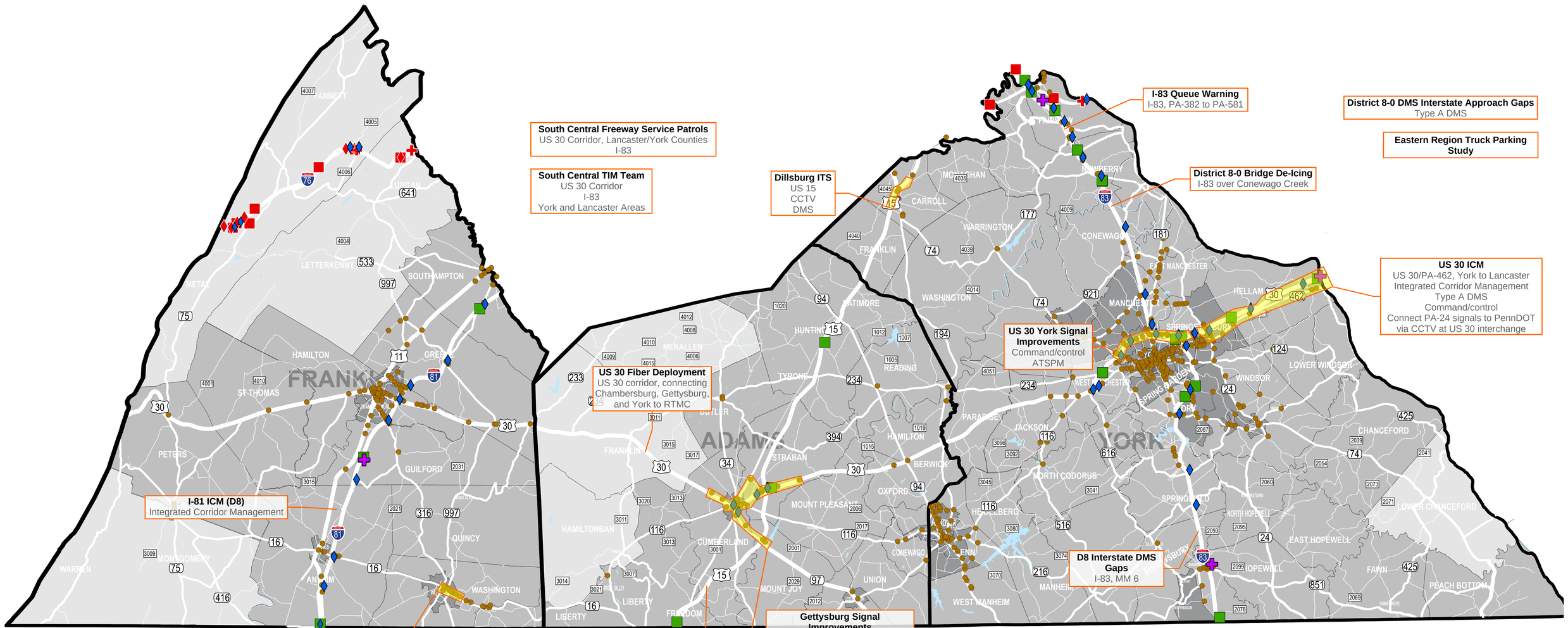
DISTRICT 8 - FRANKLIN, ADAMS, YORK COUNTY

ROP PROJECTS

LEGEND

- PENNDOT RWIS
- PENNDOT CCTV
- PENNDOT DMS
- TRAFFIC SIGNAL
- PA TURNPIKE RWIS
- PA TURNPIKE CCTV
- PA TURNPIKE DMS

(2019)



South Central Freeway Service Patrols
US 30 Corridor, Lancaster/York Counties
I-83

South Central TIM Team
US 30 Corridor
I-83
York and Lancaster Areas

Dillsburg ITS
US 15
CCTV
DMS

I-83 Queue Warning
I-83, PA-382 to PA-581

District 8-0 Bridge De-Icing
I-83 over Conewago Creek

District 8-0 DMS Interstate Approach Gaps
Type A DMS

Eastern Region Truck Parking Study

US 30 ICM
US 30/PA-462, York to Lancaster
Integrated Corridor Management
Type A DMS
Command/control
Connect PA-24 signals to PennDOT via CCTV at US 30 interchange

US 30 York Signal Improvements
Command/control
ATSPM

US 30 Fiber Deployment
US 30 corridor, connecting Chambersburg, Gettysburg, and York to RTMC

I-81 ICM (D8)
Integrated Corridor Management

D8 Interstate DMS Gaps
I-83, MM 6

D8 Interstate CCTV Gaps
I-83, MM 2, 10, 12, 15, 17, 26, and 38

Waynesboro Signal Improvements
PA-16
Equipment upgrades
Retiming

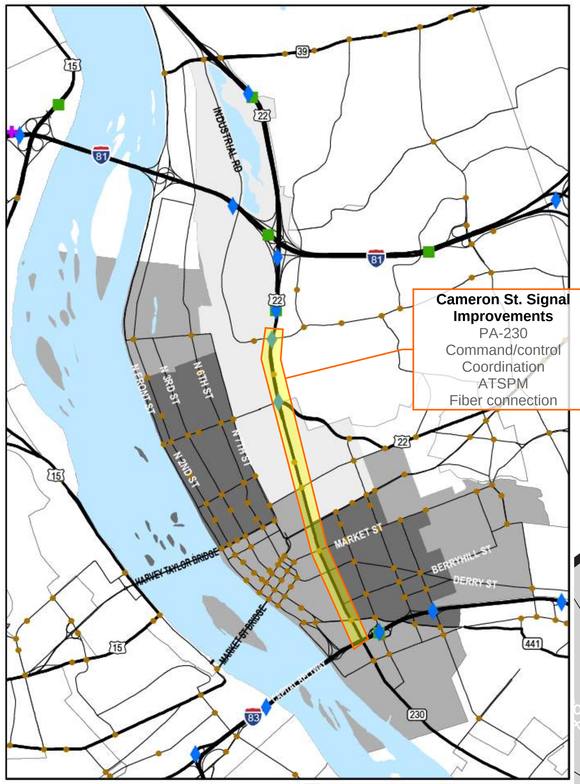
US 15 Corridor Incident Management
TIM Team
Parallel Route Improvements
Crossovers
MD SHA coordination?

Gettysburg Signal Improvements
City of Gettysburg + US 30, PA-97, and SR 3001 (Old Harrisburg Rd.)
Command/control
ATSPM
Equipment upgrades
Retiming

N

0 2.5 5 10 Miles

DISTRICT 8
HARRISBURG MPO
ROP PROJECTS



Cameron St. Signal Improvements
PA-230
Command/control
Coordination
ATSPM
Fiber connection

US 11/15 Devices
Perry County
3 CCTV and 2 Type A DMS

US 22/322 Devices
Dauphin and Perry Counties
8 CCTV and 2 DMS

District 8-0 Curve Warning
US 22/322, near Midway exit
Dynamic Curve Warning
Temporary CCTV

US 22/322 Ramp Metering
PA-39 and PA-443 westbound on-ramps

I-81 ICM (D8)
US 22/322 to I-78
Queue Detection

D8 Interstate DMS Gaps
I-81 SB, Exit 80

I-81 Freeway Service Patrol
Expand coverage to I-78

I-81 ICM (D8)
PA-39 (Linglestown Rd)
Command/control
Transit/pedestrian improvements

Marysville Signal Improvements
PA-850 @ US 15
Command/control

District 8-0 Bridge De-icing
I-81/I-83 flyover ramps

I-81 ICM (D8)
US 22
Command/control

I-81 ICM (D8)
US 11
Command/control

Cameron St. Signal Improvements
PA-230
Upgrade signal controllers, detection, and interconnect
ATSPM
Fiber connection
Access management

Governor Rd. Signal Improvements
US 322, Derry Twp.
Command/control

Carlisle Signal Improvements
US 11
Improve detection
Command/control

I-81 ICM (D8)
Integrated Corridor Management

I-81 Freeway Service Patrol
Expand coverage to Carlisle

I-83 Queue Warning
I-83, PA-382 to PA-581

D8 Interstate DMS Gaps
I-81 SB, Exit 49

Dauphin I-283/PA-283 ITS Fiber Interconnect

D8 Interstate CCTV Gaps
I-81, MM 48, 56, 66, 69, and 76
I-283, MM 1.5
I-83, MM 2, 10, 12, 15, 17, 26, and 38

D8 Interstate CCTV DMS Gaps
I-81, I-83, and I-283 at existing DMS locations:
D-81N-55
D-81N-58
D-81S-62
D-81N-63
D-81S-69
D-81S-71
D-83N-1
D-83N-15
D-83S-16
D-83N-20
D-83S-24
V-283N-1

Eastern Region Truck Parking Study

Harrisburg Transit Priority
Transit priority improvements
Bus stop/pedestrian improvements
Possible corridors include State St., Market St., 3rd St., 6th St., Derry St.

Harrisburg Transit Connections
Bus stop/pedestrian improvements
Possible corridors include Market St./Carlisle Pk., Main St./Simpson Ferry Rd., Trindle Rd. (PA-641)

District 8-0 DMS Interstate Approach Gaps
Type A DMS

LEGEND

- PENNDOT RWIS
- PENNDOT CCTV
- PENNDOT DMS
- TRAFFIC SIGNAL
- PA TURNPIKE RWIS
- PA TURNPIKE CCTV
- PA TURNPIKE DMS

(2019)

N

0 2.5 5 10 Miles

DISTRICT 8 - LANCASTER & LEBANON

ROP PROJECTS

District 8-0 Curve Warning
I-81, near MM 93

I-81 ICM (D8)
I-81, I-78, US 22
Integrated Corridor Management

D8 Interstate CCTV Gaps
I-78, MM 2

District 8-0 Curve Warning
PA-72 (Ebenezer Rd.), near Thompson Ave.
Dynamic Curve Warning

Lebanon Signal Improvements
US 422
Equipment Upgrades
Retiming

Lebanon County RWIS
PA-501, north of Turnpike

Lebanon Valley Expo Center Event Management Study

PA Renaissance Faire Event Management Study

US 30 Queue Warning
PA-462 to PA-283

PA-741 Signal Improvements
Upgrade timers
Command/control

Lititz Pk/Oregon Pk Signal Improvements
Retiming

US 30 ITS
CCTV
DMS
Add East Lampeter signals to command/control

Eastern Region Truck Parking Study

South Central Freeway Service Patrols
US 30 Corridor, Lancaster/York Counties
US 222
PA-283

Lancaster Active Transportation Short-Term Priority Projects
Christian St. Bike Boulevard

Lancaster Active Transportation Short-Term Priority Projects
Prince St - James St Intersection

Lancaster Active Transportation Short-Term Priority Projects
Farnum - Duke Connection

Lancaster Active Transportation Short-Term Priority Projects
Walnut and Chestnut St.
Separated Bike Lanes

Lancaster Signal Improvements
Command/control
ATSPMS

Lancaster Transit Operations Study
Identify corridors to prioritize transit (bus lanes, queue jumps, Transit Signal Priority, etc., consider transit priority corridors identified in latest SCTA Transit Development Plan)
Improve connectivity b/w Amtrak/Downtown
Identify Park and Ride expansion needs/opportunities

South Central TIM Team
US 30 Corridor
I-83
York and Lancaster

South Central Freeway Service Patrols
US 30 Corridor, Lancaster/York Counties
I-83

District 8-0 DMS Interstate Approach Gaps
Type A DMS

LEGEND

- PENNDOT RWIS
- PENNDOT CCTV
- PENNDOT DMS
- TRAFFIC SIGNAL
- PA TURNPIKE RWIS
- PA TURNPIKE CCTV
- PA TURNPIKE DMS

(2019)

LEBANON

LANCASTER

N

0 5 10 Miles

Appendix C. Project Descriptions

CN.01: Dauphin I-283/PA-283 ITS Fiber Interconnect

FOCUS AREA: Communications Network

PRIORITY: High

PROJECT DESCRIPTION AND SCOPE: Deployment of fiber optic cable backbone network along I-283/PA-283 corridor. Fiber network would connect Lancaster to Harrisburg and the ERTMC.

STAKEHOLDERS: **PennDOT 8-0**

ESTIMATED SCHEDULE: 3+ years Life Cycle: 25 years	**ESTIMATED COSTS:** $$$$ ($10M+)

PROJECT TYPE: Deployment **LEVEL OF EFFORT:** Complex

TECHNOLOGY COMPONENTS *(if applicable)*: Communications Infrastructure

PREREQUISITES AND DEPENDENCIES: N/A

PERFORMANCE MEASURES: Number of Miles of Installed Fiber Optic Cable

BENEFITS: A fiber optic backbone along this key US Route would increase connectivity and greatly increase the ability of PennDOT to expand their deployment of ITS and other technology. This would also allow for traffic signal data to be brought back to the RTMC for future unified command and control operations on signal corridors.

OTHER CONSIDERATIONS AND ISSUES: N/A

CN.02: US 30 Fiber Deployment

FOCUS AREA: Communications Network

PRIORITY: Normal

PROJECT DESCRIPTION AND SCOPE: Deployment of fiber optic cable backbone network along US 30 corridor through Eastern Region. Fiber network would connect Chambersburg, Gettysburg, and York back to the ERTMC.

STAKEHOLDERS: **PennDOT 8-0**

ESTIMATED SCHEDULE: 3+ years Life Cycle: 25 years	**ESTIMATED COSTS:** $$$$ ($10M+)

PROJECT TYPE: Deployment **LEVEL OF EFFORT:** Complex

TECHNOLOGY COMPONENTS *(if applicable)*: Communications Infrastructure

PREREQUISITES AND DEPENDENCIES: N/A

PERFORMANCE MEASURES: Number of Miles of Installed Fiber Optic Cable

BENEFITS: A fiber optic backbone along this key US Route would increase connectivity and greatly increase the ability of PennDOT to expand their deployment of ITS and other technology. This would also allow for traffic signal data to be brought back to the RTMC for future unified command and control operations on signal corridors.

OTHER CONSIDERATIONS AND ISSUES: N/A

FA.01: Tilghman St. Signal Improvements

FOCUS AREA: Freeway and Arterial Operations

PRIORITY: High

PROJECT DESCRIPTION AND SCOPE: Upgrade signal controllers to allow for command/control functionality and Automated Traffic Signal Performance Measures on SR 1002 in Allentown (Lehigh County). This would include approximately 22 signalized intersections.

STAKEHOLDERS: **PennDOT 5-0**

ESTIMATED SCHEDULE: 1-3 years Life Cycle: 10-15 years	**ESTIMATED COSTS:** $$ ($500k-$2M)

PROJECT TYPE: Deployment **LEVEL OF EFFORT:** Moderate

TECHNOLOGY COMPONENTS *(if applicable)*: Traffic Signal Systems;

PREREQUISITES AND DEPENDENCIES: N/A

PERFORMANCE MEASURES: Improved Travel Time Ratio

BENEFITS: Improved traffic flow and reduced congestion along important signalized corridor in Allentown.

OTHER CONSIDERATIONS AND ISSUES: N/A

FA.02: Cressona Signal Improvements

FOCUS AREA: Freeway and Arterial Operations

PRIORITY: High

PROJECT DESCRIPTION AND SCOPE: Upgrade signal equipment and retime signals on PA-183 in Cressona (Schuylkill County). This would include approximately 5 signalized intersections.

STAKEHOLDERS: **PennDOT 5-0**

ESTIMATED SCHEDULE: 1-3 years Life Cycle: 10-15 years	**ESTIMATED COSTS:** $$ ($500k-$2M)

PROJECT TYPE: Deployment **LEVEL OF EFFORT:** Moderate

TECHNOLOGY COMPONENTS *(if applicable)*: Traffic Signal Systems;

PREREQUISITES AND DEPENDENCIES: N/A

PERFORMANCE MEASURES: Improved Travel Time Ratio

BENEFITS: Improved traffic flow and reduced congestion along an important signalized corridor within the region.

OTHER CONSIDERATIONS AND ISSUES: N/A

FA.03: Tamaqua Signal Improvements

FOCUS AREA: Freeway and Arterial Operations

PRIORITY: High

PROJECT DESCRIPTION AND SCOPE: Upgrade signal controllers to allow for Automated Traffic Signal Performance Measures on PA-309 in Tamaqua (Schuylkill County). This would include approximately 7 signalized intersections).

STAKEHOLDERS: **PennDOT 5-0**

ESTIMATED SCHEDULE: 1-3 years Life Cycle: 10-15 years	**ESTIMATED COSTS:** $$ ($500k-$2M)

PROJECT TYPE: Deployment **LEVEL OF EFFORT:** Moderate

TECHNOLOGY COMPONENTS *(if applicable)*: Traffic Signal Systems;

PREREQUISITES AND DEPENDENCIES: N/A

PERFORMANCE MEASURES: Improved Travel Time Ratio

BENEFITS: Improved traffic flow and reduced congestion along an important signalized corridor within the region.

OTHER CONSIDERATIONS AND ISSUES: N/A

FA.04: US 22/I-78 ICM

FOCUS AREA: Freeway and Arterial Operations

PRIORITY: High

PROJECT DESCRIPTION AND SCOPE: Integrated Corridor Management of US 22, I-78, and parallel corridors in Lehigh and Northampton Counties. Installation of CCTV cameras and DMS at strategic locations on US 22, I-78, PA-33, PA-378 and other pre-entry locations. Display of travel time information. Possible deployment of Variable Speed Limits and Queue Detection. Possible Flex Lanes for I-78 westbound between Exits 67-71. Fiber network to include I-78, US 22, and PA-33. Parallel route traffic signal improvements.

STAKEHOLDERS: **PennDOT 5-0**

ESTIMATED SCHEDULE: 3+ years Life Cycle: 10-15 years	**ESTIMATED COSTS:** $$$ ($2M-$10M)

PROJECT TYPE: Deployment **LEVEL OF EFFORT:** Moderate

TECHNOLOGY COMPONENTS *(if applicable)*: Traffic Signal Systems; CCTV System; DMS System; Queue Detection System; Variable Speed Display System; Flex Lane System

PREREQUISITES AND DEPENDENCIES: N/A

PERFORMANCE MEASURES: Reduced Bottleneck Delay Surrogate; Improved Travel Time Ratio

BENEFITS: Improving incident management and operations on parallel corridors, optimizing available capacity on I-78, US 22, and parallel corridors.

OTHER CONSIDERATIONS AND ISSUES: N/A

FA.05: I-81 ICM (D8)

FOCUS AREA: Freeway and Arterial Operations

PRIORITY: High

PROJECT DESCRIPTION AND SCOPE: Integrated Corridor Management of I-81 and parallel corridors through District 8-0. Installation of CCTV cameras and DMS at strategic locations. Queue Detection from US 22/322 to I-78. Parallel route traffic signal improvements. Consider including TIM.03 (I-81 Freeway Service Patrol) in coordination with this project.

STAKEHOLDERS: **PennDOT 8-0**

ESTIMATED SCHEDULE: 3+ years Life Cycle: 10-15 years	**ESTIMATED COSTS:** $$$ ($2M-$10M)

PROJECT TYPE: Deployment **LEVEL OF EFFORT:** Moderate

TECHNOLOGY COMPONENTS *(if applicable)*: Traffic Signal Systems; CCTV System; DMS System; Queue Detection System

PREREQUISITES AND DEPENDENCIES: Coordinate with ongoing I-81 Improvement Strategy study

PERFORMANCE MEASURES: Reduced Bottleneck Delay Surrogate; Improved Travel Time Ratio

BENEFITS: Improving incident management and operations on parallel corridors, optimizing available capacity on I-81 and parallel corridors.

OTHER CONSIDERATIONS AND ISSUES: Coordinate with TIM.03 (I-81 Freeway Service Patrol).

FA.06: Cameron St. Signal Improvements

FOCUS AREA: Freeway and Arterial Operations

PRIORITY: High

PROJECT DESCRIPTION AND SCOPE: Upgrade signal controllers, detection, and interconnection on PA-230 in Harrisburg (Dauphin County). Determine capability of producing Automated Traffic Signal Performance Measures within existing Transparity closed system. Connect corridor to shared fiber network with PennDOT to provide a loop to I-83 ITS devices. Consider improvements to access management. This project would include approximately 6 signalized intersections.

STAKEHOLDERS: **PennDOT 8-0**

ESTIMATED SCHEDULE: 3+ years Life Cycle: 10-15 years	**ESTIMATED COSTS:** $$ ($500k-$2M)

PROJECT TYPE: Deployment **LEVEL OF EFFORT:** Moderate

TECHNOLOGY COMPONENTS *(if applicable)*: Traffic Signal Systems;

PREREQUISITES AND DEPENDENCIES: N/A

PERFORMANCE MEASURES: Improved Travel Time Ratio

BENEFITS: Improved traffic flow and reduced congestion along an important signalized corridor within the region. Access management improvements would greatly improve traffic flow, allow for better signal coordination, and increased safety.

OTHER CONSIDERATIONS AND ISSUES: N/A

FA.07: PA-924 Ramp Preemption

FOCUS AREA: Freeway and Arterial Operations

PRIORITY: Normal

PROJECT DESCRIPTION AND SCOPE: Installation of ramp preemption system on I-81 off-ramps to Can Do Expressway in Luzerne County.

STAKEHOLDERS: **PennDOT 4-0**

ESTIMATED SCHEDULE: 1-3 years Life Cycle: 10-15 years	**ESTIMATED COSTS:** $ (<$500k)

PROJECT TYPE: Deployment **LEVEL OF EFFORT:** Moderate

TECHNOLOGY COMPONENTS *(if applicable)*: Traffic Signal Systems;

PREREQUISITES AND DEPENDENCIES: N/A

PERFORMANCE MEASURES: Reduced Queue Spillback

BENEFITS: Reduce frequency and duration of queue spillback from traffic signals onto mainline I-81.

OTHER CONSIDERATIONS AND ISSUES: N/A

FA.08: Marysville Signal Improvements

FOCUS AREA: Freeway and Arterial Operations

PRIORITY: Normal

PROJECT DESCRIPTION AND SCOPE: Upgrade signal controller, detection, and communications to allow for command/control functionality at US 11/15 intersection with PA-850 (Perry County).

STAKEHOLDERS: **PennDOT 8-0**

ESTIMATED SCHEDULE: 1-3 years Life Cycle: 10-15 years	**ESTIMATED COSTS:** $ (<$500k)

PROJECT TYPE: Deployment **LEVEL OF EFFORT:** Moderate

TECHNOLOGY COMPONENTS *(if applicable)*: Traffic Signal Systems;

PREREQUISITES AND DEPENDENCIES: N/A

PERFORMANCE MEASURES: Improved Travel Time Ratio

BENEFITS: Improved traffic flow and reduced congestion along an important signalized corridor within the region.

OTHER CONSIDERATIONS AND ISSUES: N/A

FA.09: US 22/322 Ramp Metering

FOCUS AREA: Freeway and Arterial Operations

PRIORITY: Normal

PROJECT DESCRIPTION AND SCOPE: Install ramp metering at PA-39 and PA-443 interchanges for westbound on-ramps to US 22/322 in Dauphin County.

STAKEHOLDERS: **PennDOT 8-0**

ESTIMATED SCHEDULE: 1-3 years Life Cycle: 10-15 years	**ESTIMATED COSTS:** $ (<$500k)

PROJECT TYPE: Deployment **LEVEL OF EFFORT:** Moderate

TECHNOLOGY COMPONENTS *(if applicable)*: Ramp Metering System

PREREQUISITES AND DEPENDENCIES: N/A

PERFORMANCE MEASURES: Reduced Bottleneck Delay Surrogate; Improved Travel Time Ratio

BENEFITS: Improve traffic flow of US 22/322 by managing on-ramp volume.

OTHER CONSIDERATIONS AND ISSUES: N/A

FA.10: Jim Thorpe Operations Improvements

FOCUS AREA: Freeway and Arterial Operations

PRIORITY: Normal

PROJECT DESCRIPTION AND SCOPE: Install DMS and Smart Parking System in Jim Thorpe area (Carbon County). Upgrade traffic signal infrastructure and signal timings.

STAKEHOLDERS: **PennDOT 5-0**

ESTIMATED SCHEDULE: 1-3 years Life Cycle: 10-15 years	**ESTIMATED COSTS:** $$ ($500k-$2M)

PROJECT TYPE: Deployment **LEVEL OF EFFORT:** Moderate

TECHNOLOGY COMPONENTS *(if applicable)*: Smart Parking System; DMS System: Traffic Signal Systems

PREREQUISITES AND DEPENDENCIES: N/A

PERFORMANCE MEASURES: Reduced Bottleneck Delay Surrogate; Improved Travel Time Ratio;

BENEFITS: improved traffic flow and reduced congestion, particularly during seasonal special events.

OTHER CONSIDERATIONS AND ISSUES: Coordinate improvements with *Parking Analysis and Complete Streets Evaluation for Downtown Jim Thorpe Borough*, a study released in June 2020.

FA.11: Church St. Signal Improvements

FOCUS AREA: Freeway and Arterial Operations

PRIORITY: Normal

PROJECT DESCRIPTION AND SCOPE: Upgrade signal timing and coordination on PA-309 in Hazleton (Luzerne County). This would include approximately 10 signalized intersections.

STAKEHOLDERS: **PennDOT 4-0**

ESTIMATED SCHEDULE: 1-3 years Life Cycle: 10-15 years	**ESTIMATED COSTS:** $$ ($500k-$2M)

PROJECT TYPE: Deployment **LEVEL OF EFFORT:** Moderate

TECHNOLOGY COMPONENTS *(if applicable)*: Traffic Signal Systems;

PREREQUISITES AND DEPENDENCIES: N/A

PERFORMANCE MEASURES: Improved Travel Time Ratio

BENEFITS: Improved traffic flow and reduced congestion along an important signalized corridor within the region.

OTHER CONSIDERATIONS AND ISSUES: N/A

FA.12: Davis St. Signal Improvements

FOCUS AREA: Freeway and Arterial Operations

PRIORITY: Normal

PROJECT DESCRIPTION AND SCOPE: Upgrade signal timing and coordination on SR 3016 in Scranton (Lackawanna County). This would include approximately 4 signalized intersections.

STAKEHOLDERS: **PennDOT 4-0**

ESTIMATED SCHEDULE: 1-3 years Life Cycle: 10-15 years	**ESTIMATED COSTS:** $$ ($500k-$2M)

PROJECT TYPE: Deployment **LEVEL OF EFFORT:** Moderate

TECHNOLOGY COMPONENTS *(if applicable)*: Traffic Signal Systems;

PREREQUISITES AND DEPENDENCIES: N/A

PERFORMANCE MEASURES: Improved Travel Time Ratio

BENEFITS: Improved traffic flow and reduced congestion along an important signalized corridor within the region.

OTHER CONSIDERATIONS AND ISSUES: N/A

FA.13: Wilkes-Barre Signal Improvements

FOCUS AREA: Freeway and Arterial Operations

PRIORITY: Normal

PROJECT DESCRIPTION AND SCOPE: Upgrade signal controllers to allow for Automated Traffic Signal Performance Measures functionality on Pennsylvania Avenue and Wilkes-Barre Boulevard (Luzerne County). This would include approximately 9 signalized intersections.

STAKEHOLDERS: **PennDOT 4-0**

ESTIMATED SCHEDULE: 1-3 years Life Cycle: 10-15 years	**ESTIMATED COSTS:** $$ ($500k-$2M)

PROJECT TYPE: Deployment **LEVEL OF EFFORT:** Moderate

TECHNOLOGY COMPONENTS *(if applicable)*: Traffic Signal Systems;

PREREQUISITES AND DEPENDENCIES: N/A

PERFORMANCE MEASURES: Improved Travel Time Ratio

BENEFITS: Improved traffic flow and reduced congestion along a pair of important signalized corridors within the region.

OTHER CONSIDERATIONS AND ISSUES: N/A

FA.14: Milford Operations Improvements

FOCUS AREA: Freeway and Arterial Operations

PRIORITY: Normal

PROJECT DESCRIPTION AND SCOPE: Addition of TSMO strategies along US 6 and US 209 in and around Milford (Pike County). Specific strategies to be determined.

STAKEHOLDERS: **PennDOT 4-0**

ESTIMATED SCHEDULE: 1-3 years Life Cycle: 10-15 years	**ESTIMATED COSTS:** $$ ($500k-$2M)

PROJECT TYPE: Deployment **LEVEL OF EFFORT:** Moderate

TECHNOLOGY COMPONENTS *(if applicable)*: TBD

PREREQUISITES AND DEPENDENCIES: N/A

PERFORMANCE MEASURES: Reduced Bottleneck Delay Surrogate; Improved Travel Time Ratio

BENEFITS: improved traffic flow and reduced congestion, particularly during seasonal peaks and during incidents on I-80.

OTHER CONSIDERATIONS AND ISSUES: Coordinate improvements with Milford Borough operations study currently in progress.

FA.15: Downtown Easton Signal Improvements

FOCUS AREA: Freeway and Arterial Operations

PRIORITY: Normal

PROJECT DESCRIPTION AND SCOPE: Upgrade signal controllers to allow for Automated Traffic Signal Performance Measures functionality on PA-248 (Northampton Street) and 3rd Street (Northampton County). This would include approximately 17 signalized intersections. Also consider inclusion of Transit Signal Priority.

STAKEHOLDERS: **PennDOT 5-0**, LANTA

ESTIMATED SCHEDULE: 1-3 years Life Cycle: 10-15 years	**ESTIMATED COSTS:** $$ ($500k-$2M)

PROJECT TYPE: Deployment **LEVEL OF EFFORT:** Moderate

TECHNOLOGY COMPONENTS *(if applicable)*: Traffic Signal Systems

PREREQUISITES AND DEPENDENCIES: N/A

PERFORMANCE MEASURES: Improved Travel Time Ratio

BENEFITS: Improved traffic flow and reduced congestion along a pair of important signalized corridors within the region.

OTHER CONSIDERATIONS AND ISSUES: N/A

FA.16: Emmaus Ave. Signal Improvements

FOCUS AREA: Freeway and Arterial Operations

PRIORITY: Normal

PROJECT DESCRIPTION AND SCOPE: Upgrade signal equipment and update signal timing along SR 2002 corridor (Lehigh County). This would include approximately 6 signalized intersections.

STAKEHOLDERS: **PennDOT 5-0**

ESTIMATED SCHEDULE: 1-3 years Life Cycle: 10-15 years	**ESTIMATED COSTS:** $$ ($500k-$2M)

PROJECT TYPE: Deployment **LEVEL OF EFFORT:** Moderate

TECHNOLOGY COMPONENTS *(if applicable)*: Traffic Signal Systems

PREREQUISITES AND DEPENDENCIES: N/A

PERFORMANCE MEASURES: Improved Travel Time Ratio

BENEFITS: Improved traffic flow and reduced congestion along an important signalized corridor within the region.

OTHER CONSIDERATIONS AND ISSUES: N/A

FA.17: Hill to Hill Bridge Signal Improvements

FOCUS AREA: Freeway and Arterial Operations

PRIORITY: Normal

PROJECT DESCRIPTION AND SCOPE: Upgrade signal controllers to allow for command/control functionality and Automated Traffic Signal Performance Measures on PA-378 (Northampton County. This would include approximately 4 signalized intersections.

STAKEHOLDERS: **PennDOT 5-0**

ESTIMATED SCHEDULE: 1-3 years Life Cycle: 10-15 years	**ESTIMATED COSTS:** $$ ($500k-$2M)

PROJECT TYPE: Deployment **LEVEL OF EFFORT:** Moderate

TECHNOLOGY COMPONENTS *(if applicable)*: Traffic Signal Systems

PREREQUISITES AND DEPENDENCIES: N/A

PERFORMANCE MEASURES: Improved Travel Time Ratio

BENEFITS: Improved traffic flow and reduced congestion along an important signalized corridor within the region.

OTHER CONSIDERATIONS AND ISSUES: N/A

FA.18: PA-100 Signal Improvements

FOCUS AREA: Freeway and Arterial Operations

PRIORITY: Normal

PROJECT DESCRIPTION AND SCOPE: Upgrade signal controllers to allow for command/control functionality and Automated Traffic Signal Performance Measures on PA-100 in Upper Macungie Township (Lehigh County). This would include approximately 7 signalized intersections. Provide pedestrian improvements along corridor.

STAKEHOLDERS: **PennDOT 5-0**

ESTIMATED SCHEDULE: 1-3 years Life Cycle: 10-15 years	**ESTIMATED COSTS:** $$ ($500k-$2M)

PROJECT TYPE: Deployment **LEVEL OF EFFORT:** Moderate

TECHNOLOGY COMPONENTS *(if applicable)*: Traffic Signal Systems

PREREQUISITES AND DEPENDENCIES: N/A

PERFORMANCE MEASURES: Improved Travel Time Ratio

BENEFITS: Improved traffic flow and reduced congestion along an important signalized corridor within the region. Improved pedestrian connections between bus stops and employers along and near the corridor.

OTHER CONSIDERATIONS AND ISSUES: N/A

FA.19: PA-329 Signal Improvements

FOCUS AREA: Freeway and Arterial Operations

PRIORITY: Normal

PROJECT DESCRIPTION AND SCOPE: Upgrade signal controllers to allow for Automated Traffic Signal Performance Measures on PA-329 west of Airport Road (Lehigh County). This would include approximately 8 signalized intersections.

STAKEHOLDERS: **PennDOT 5-0**

ESTIMATED SCHEDULE: 1-3 years Life Cycle: 10-15 years	**ESTIMATED COSTS:** $$ ($500k-$2M)

PROJECT TYPE: Deployment **LEVEL OF EFFORT:** Moderate

TECHNOLOGY COMPONENTS *(if applicable)*: Traffic Signal Systems

PREREQUISITES AND DEPENDENCIES: N/A

PERFORMANCE MEASURES: Improved Travel Time Ratio

BENEFITS: Improved traffic flow and reduced congestion along an important signalized corridor within the region.

OTHER CONSIDERATIONS AND ISSUES: N/A

FA.20: US 222 Signal Improvements

FOCUS AREA: Freeway and Arterial Operations

PRIORITY: Normal

PROJECT DESCRIPTION AND SCOPE: Upgrade signal controllers to allow for command/control functionality and Automated Traffic Signal Performance Measures on US 222/Hamilton Boulevard (Lehigh County). This would include approximately 17 signalized intersections. Provide pedestrian improvements along corridor, including safer and more frequent crossings. Consider Bus-on-Shoulder operations.

STAKEHOLDERS: **PennDOT 5-0**

ESTIMATED SCHEDULE: 1-3 years Life Cycle: 10-15 years	**ESTIMATED COSTS:** $$ ($500k-$2M)

PROJECT TYPE: Deployment **LEVEL OF EFFORT:** Moderate

TECHNOLOGY COMPONENTS *(if applicable)*: Traffic Signal Systems

PREREQUISITES AND DEPENDENCIES: N/A

PERFORMANCE MEASURES: Improved Travel Time Ratio; Reduction in Pedestrian Crashes; Increased Bus Speeds; Increased Bus Ridership

BENEFITS: Improved traffic flow and reduced congestion along an important signalized corridor within the region. Improved pedestrian connections along corridor, particularly providing safer access to and from bus stops. Bus-on-Shoulder operations could also increase speed and reliability of transit service.

OTHER CONSIDERATIONS AND ISSUES: N/A

FA.21: Palmerton Signal Improvements

FOCUS AREA: Freeway and Arterial Operations

PRIORITY: Normal

PROJECT DESCRIPTION AND SCOPE: Upgrade signal equipment and update signal timing along SR 2002 (Delaware Ave.) corridor (Carbon County). This would include approximately 3 signalized intersections.

STAKEHOLDERS: **PennDOT 5-0**

ESTIMATED SCHEDULE: 1-3 years Life Cycle: 10-15 years	**ESTIMATED COSTS:** $$ ($500k-$2M)

PROJECT TYPE: Deployment **LEVEL OF EFFORT:** Moderate

TECHNOLOGY COMPONENTS *(if applicable)*: Traffic Signal Systems

PREREQUISITES AND DEPENDENCIES: N/A

PERFORMANCE MEASURES: Improved Travel Time Ratio

BENEFITS: Improved traffic flow and reduced congestion along an important signalized corridor within the region.

OTHER CONSIDERATIONS AND ISSUES: N/A

FA.22: Boyertown Signal Improvements

FOCUS AREA: Freeway and Arterial Operations

PRIORITY: Normal

PROJECT DESCRIPTION AND SCOPE: Upgrade signal equipment and update signal timing along PA-73 corridor (Berks County). This would include approximately 5 signalized intersections.

STAKEHOLDERS: **PennDOT 5-0**

ESTIMATED SCHEDULE: 1-3 years Life Cycle: 10-15 years	**ESTIMATED COSTS:** $$ ($500k-$2M)

PROJECT TYPE: Deployment **LEVEL OF EFFORT:** Moderate

TECHNOLOGY COMPONENTS *(if applicable)*: Traffic Signal Systems

PREREQUISITES AND DEPENDENCIES: N/A

PERFORMANCE MEASURES: Improved Travel Time Ratio

BENEFITS: Improved traffic flow and reduced congestion along an important signalized corridor within the region.

OTHER CONSIDERATIONS AND ISSUES: N/A

FA.23: Waynesboro Signal Improvements

FOCUS AREA: Freeway and Arterial Operations

PRIORITY: Normal

PROJECT DESCRIPTION AND SCOPE: Upgrade signal equipment and update signal timing along PA-16 corridor (Franklin County). This would include approximately 8 signalized intersections.

STAKEHOLDERS: **PennDOT 8-0**

ESTIMATED SCHEDULE: 1-3 years Life Cycle: 10-15 years	**ESTIMATED COSTS:** $$ ($500k-$2M)

PROJECT TYPE: Deployment **LEVEL OF EFFORT:** Moderate

TECHNOLOGY COMPONENTS *(if applicable)*: Traffic Signal Systems

PREREQUISITES AND DEPENDENCIES: N/A

PERFORMANCE MEASURES: Improved Travel Time Ratio

BENEFITS: Improved traffic flow and reduced congestion along an important signalized corridor within the region.

OTHER CONSIDERATIONS AND ISSUES: N/A

FA.24: Carlisle Signal Improvements

FOCUS AREA: Freeway and Arterial Operations

PRIORITY: Normal

PROJECT DESCRIPTION AND SCOPE: Upgrade signal controllers and detection as necessary to allow for command/control functionality along US 11 adaptive signal corridor (Cumberland County). This would include approximately 20 signalized intersections.

STAKEHOLDERS: **PennDOT 8-0**

ESTIMATED SCHEDULE: 1-3 years Life Cycle: 10-15 years	**ESTIMATED COSTS:** $$ ($500k-$2M)

PROJECT TYPE: Deployment **LEVEL OF EFFORT:** Moderate

TECHNOLOGY COMPONENTS *(if applicable)*: Traffic Signal Systems

PREREQUISITES AND DEPENDENCIES: N/A

PERFORMANCE MEASURES: Improved Travel Time Ratio

BENEFITS: Improved traffic flow and reduced congestion along an important signalized corridor within the region. Improved operations during I-81 detour events.

OTHER CONSIDERATIONS AND ISSUES: N/A

FA.25: Governor Rd. Signal Improvements

FOCUS AREA: Freeway and Arterial Operations

PRIORITY: Normal

PROJECT DESCRIPTION AND SCOPE: Upgrade signal controllers, detection, and interconnect to allow for command/control functionality along US 322 in Derry Township (Dauphin County). This would include approximately 7 signalized intersections.

STAKEHOLDERS: **PennDOT 8-0**

ESTIMATED SCHEDULE: 1-3 years Life Cycle: 10-15 years	**ESTIMATED COSTS:** $$ ($500k-$2M)

PROJECT TYPE: Deployment **LEVEL OF EFFORT:** Moderate

TECHNOLOGY COMPONENTS *(if applicable)*: Traffic Signal Systems;

PREREQUISITES AND DEPENDENCIES: N/A

PERFORMANCE MEASURES: Improved Travel Time Ratio

BENEFITS: Improved traffic flow and reduced congestion along an important signalized corridor within the region.

OTHER CONSIDERATIONS AND ISSUES: N/A

FA.26: I-83 Queue Warning

FOCUS AREA: Freeway and Arterial Operations

PRIORITY: Normal

PROJECT DESCRIPTION AND SCOPE: Install queue warning system on northbound I-83, from PA-382 to PA-581 (Dauphin/York Counties). Utilize existing DMS for display of generated queue warning messages if possible. Install additional DMS if needed.

STAKEHOLDERS: **PennDOT 8-0**

ESTIMATED SCHEDULE: 1-3 years Life Cycle: 10-15 years	**ESTIMATED COSTS:** $$ ($500k-$2M)

PROJECT TYPE: Deployment **LEVEL OF EFFORT:** Moderate

TECHNOLOGY COMPONENTS *(if applicable)*: Queue Detection System; DMS System

PREREQUISITES AND DEPENDENCIES: N/A

PERFORMANCE MEASURES: Reduction in Rear End Crashes; Reduced Bottleneck Delay Surrogate

BENEFITS: Provide warning to drivers as they approach area of recurring congestion along I-83.

OTHER CONSIDERATIONS AND ISSUES: N/A

FA.27: Lancaster Signal Improvements

FOCUS AREA: Freeway and Arterial Operations

PRIORITY: Normal

PROJECT DESCRIPTION AND SCOPE: Upgrade signalized corridors in the City of Lancaster, including new signal controllers to allow for command/control functionality and Automated Traffic Signal Performance Measures. Connect existing traffic signals and ITS devices via upcoming fiber network project. This would include approximately 60 signalized intersections.

STAKEHOLDERS: **PennDOT 8-0**

ESTIMATED SCHEDULE: 1-3 years Life Cycle: 10-15 years	**ESTIMATED COSTS:** $$ ($500k-$2M)

PROJECT TYPE: Deployment **LEVEL OF EFFORT:** Moderate

TECHNOLOGY COMPONENTS *(if applicable)*: Traffic Signal Systems

PREREQUISITES AND DEPENDENCIES: Coordinate with upcoming fiber network project in Lancaster area.

PERFORMANCE MEASURES: Improved Travel Time Ratio

BENEFITS: Improved traffic flow and reduced congestion along important signalized corridors that run through the City of Lancaster.

OTHER CONSIDERATIONS AND ISSUES: N/A

FA.28: PA-741 Signal Improvements

FOCUS AREA: Freeway and Arterial Operations

PRIORITY: Normal

PROJECT DESCRIPTION AND SCOPE: Upgrade signal controllers to allow for command/control functionality on PA-741 from Harrisburg Pike to PA-462 (Lancaster County). Upgrade signal timers. This would include approximately 10 signalized intersections.

STAKEHOLDERS: **PennDOT 8-0**

ESTIMATED SCHEDULE: 1-3 years Life Cycle: 10-15 years	**ESTIMATED COSTS:** $$ ($500k-$2M)

PROJECT TYPE: Deployment **LEVEL OF EFFORT:** Moderate

TECHNOLOGY COMPONENTS *(if applicable)*: Traffic Signal Systems

PREREQUISITES AND DEPENDENCIES: N/A

PERFORMANCE MEASURES: Improved Travel Time Ratio

BENEFITS: Improved traffic flow and reduced congestion along an important signalized corridor within the region.

OTHER CONSIDERATIONS AND ISSUES: N/A

FA.29: Lititz Pk./Oregon Pk. Signal Improvements

FOCUS AREA: Freeway and Arterial Operations

PRIORITY: Normal

PROJECT DESCRIPTION AND SCOPE: Upgrade signal controllers to allow for command/control functionality on US 222 and PA-501 corridors near US 30 (Lancaster County). Upgrade signal timers. This would include approximately 6 signalized intersections.

STAKEHOLDERS: **PennDOT 8-0**

ESTIMATED SCHEDULE: 1-3 years Life Cycle: 10-15 years	**ESTIMATED COSTS:** $$ ($500k-$2M)

PROJECT TYPE: Deployment **LEVEL OF EFFORT:** Moderate

TECHNOLOGY COMPONENTS *(if applicable)*: Traffic Signal Systems

PREREQUISITES AND DEPENDENCIES: N/A

PERFORMANCE MEASURES: Improved Travel Time Ratio

BENEFITS: Improved traffic flow and reduced congestion along a pair of important signalized corridors within the region.

OTHER CONSIDERATIONS AND ISSUES: N/A

FA.30: US 30 Queue Warning

FOCUS AREA: Freeway and Arterial Operations

PRIORITY: Normal

PROJECT DESCRIPTION AND SCOPE: Install queue warning system on eastbound and westbound US 30, from PA-462 to PA-283 (Lancaster County). Utilize existing DMS for display of generated queue warning messages as possible. Install additional DMS if needed.

STAKEHOLDERS: **PennDOT 8-0**

ESTIMATED SCHEDULE: 1-3 years Life Cycle: 10-15 years	**ESTIMATED COSTS:** $$ ($500k-$2M)

PROJECT TYPE: Deployment **LEVEL OF EFFORT:** Moderate

TECHNOLOGY COMPONENTS *(if applicable)*: Queue Detection System; DMS System

PREREQUISITES AND DEPENDENCIES: N/A

PERFORMANCE MEASURES: Reduction in Rear End Crashes; Reduced Bottleneck Delay Surrogate

BENEFITS: Provide warning to drivers as they approach area of recurring congestion along US 30.

OTHER CONSIDERATIONS AND ISSUES: N/A

FA.31: Lebanon Signal Improvements

FOCUS AREA: Freeway and Arterial Operations

PRIORITY: Normal

PROJECT DESCRIPTION AND SCOPE: Upgrade signal equipment and update signal timing along US 422 corridor (Lebanon County). This would include approximately 17 signalized intersections.

STAKEHOLDERS: **PennDOT 8-0**

ESTIMATED SCHEDULE: 1-3 years Life Cycle: 10-15 years	**ESTIMATED COSTS:** $$ ($500k-$2M)

PROJECT TYPE: Deployment **LEVEL OF EFFORT:** Moderate

TECHNOLOGY COMPONENTS *(if applicable)*: Traffic Signal Systems

PREREQUISITES AND DEPENDENCIES: N/A

PERFORMANCE MEASURES: Improved Travel Time Ratio

BENEFITS: Improved traffic flow and reduced congestion along an important signalized corridor within the region.

OTHER CONSIDERATIONS AND ISSUES: N/A

FA.32: US 30 York Signal Improvements

FOCUS AREA: Freeway and Arterial Operations

PRIORITY: Normal

PROJECT DESCRIPTION AND SCOPE: Upgrade signal controllers to allow for command/control functionality and Automated Traffic Signal Performance Measures on US 30 (York County). This would include approximately 10 signalized intersections.

STAKEHOLDERS: **PennDOT 8-0**

ESTIMATED SCHEDULE: 1-3 years Life Cycle: 10-15 years	**ESTIMATED COSTS:** $$ ($500k-$2M)

PROJECT TYPE: Deployment **LEVEL OF EFFORT:** Moderate

TECHNOLOGY COMPONENTS *(if applicable)*: Traffic Signal Systems

PREREQUISITES AND DEPENDENCIES: N/A

PERFORMANCE MEASURES: Improved Travel Time Ratio

BENEFITS: Improved traffic flow and reduced congestion along an important signalized corridor within the region.

OTHER CONSIDERATIONS AND ISSUES: N/A

FA.33: Gettysburg Signal Improvements

FOCUS AREA: Freeway and Arterial Operations

PRIORITY: Normal

PROJECT DESCRIPTION AND SCOPE: Upgrade signalized corridors in the City of Gettysburg (Adams County), including new signal controllers to allow for command/control functionality and Automated Traffic Signal Performance Measures on some routes. Other improvements will include upgrading signal equipment and updating signal timings. Routes include US 30, PA-97, and SR 3001 (Old Harrisburg Rd.). This would include approximately 24 signalized intersections.

STAKEHOLDERS: **PennDOT 8-0**

ESTIMATED SCHEDULE: 1-3 years Life Cycle: 10-15 years	**ESTIMATED COSTS:** $$$ ($2M-$10M)

PROJECT TYPE: Deployment **LEVEL OF EFFORT:** Moderate

TECHNOLOGY COMPONENTS *(if applicable)*: Traffic Signal Systems

PREREQUISITES AND DEPENDENCIES: N/A

PERFORMANCE MEASURES: Improved Travel Time Ratio

BENEFITS: Improved traffic flow and reduced congestion along important signalized corridors that run through the City of Gettysburg.

OTHER CONSIDERATIONS AND ISSUES: N/A

FA.34: I-81 (Wilkes-Barre/Scranton) ICM

FOCUS AREA: Freeway and Arterial Operations

PRIORITY: Normal

PROJECT DESCRIPTION AND SCOPE: Integrated Corridor Management of I-81 and parallel corridors (US 11, PA-315). Installation of CCTV cameras and DMS at strategic locations. Possible deployment of Queue Detection. Possible Ramp Metering for River St. on-ramps. Possible Flex Lanes in Moosic to Dunmore section. Parallel route traffic signal improvements. Transit improvements on routes between Wilkes-Barre and Scranton.

STAKEHOLDERS: **PennDOT 4-0**, Lackawanna/Luzerne MPO, COLTS, Luzerne Transit

ESTIMATED SCHEDULE: 3+ years Life Cycle: 10-15 years	**ESTIMATED COSTS:** $$$ ($2M-$10M)

PROJECT TYPE: Deployment **LEVEL OF EFFORT:** Moderate

TECHNOLOGY COMPONENTS *(if applicable)*: Traffic Signal Systems; CCTV System; DMS System; Queue Detection System; Ramp Meter System; Flex Lane System

PREREQUISITES AND DEPENDENCIES: N/A

PERFORMANCE MEASURES: Reduced Bottleneck Delay Surrogate; Improved Travel Time Ratio; Increased Bus Speeds; Increased Bus Ridership

BENEFITS: Improving incident management and operations on parallel corridors, optimizing available capacity on I-81 and parallel corridors. Reduced congestion and improved traffic flow along I-81. Potential positive mode shift to transit, reducing single-occupant vehicle usage and increasing efficiency of the overall transportation network.

OTHER CONSIDERATIONS AND ISSUES: N/A

FA.35: I-80 (Monroe) ITS

FOCUS AREA: Freeway and Arterial Operations

PRIORITY: Normal

PROJECT DESCRIPTION AND SCOPE: Integrated Corridor Management of I-80 and parallel corridors such as PA-611. Installation of CCTV cameras and DMS at strategic locations. Possible Junction Control at I-380 interchange. Possible Ramp metering at East Stroudsburg on-ramps. Possible deployment of Variable Speed Limits and Queue Detection. Parallel route traffic signal improvements on PA-611. Possible Martz Park & Ride expansion and other transit-related improvements.

STAKEHOLDERS: **PennDOT 5-0**, NEPA MPO, Martz, Monroe County Transit Authority

ESTIMATED SCHEDULE: 3+ years Life Cycle: 10-15 years	**ESTIMATED COSTS:** $$$ ($2M-$10M)

PROJECT TYPE: Deployment **LEVEL OF EFFORT:** Moderate

TECHNOLOGY COMPONENTS *(if applicable)*: Traffic Signal Systems; CCTV System; DMS System; Queue Detection System; Variable Speed Display System; Ramp Metering System; Junction Control System

PREREQUISITES AND DEPENDENCIES: N/A

PERFORMANCE MEASURES: Reduced Bottleneck Delay Surrogate; Improved Travel Time Ratio; Increased Bus Ridership

BENEFITS: Improving incident management and operations on I-80 corridor, optimizing available capacity on I-80 and parallel routes. Reduced congestion and improved traffic flow along I-80. Potential positive mode shift to transit, reducing single-occupant vehicle usage and increasing efficiency of the overall transportation network.

OTHER CONSIDERATIONS AND ISSUES: Coordinate improvements with NJDOT. Coordinate improvements with possible commuter rail service between Scranton and Hoboken. Coordinate ITS improvements with "SR 0080 Section LBS – I-80 LBS Advanced Traffic Studies Existing Study Area ITS" memo, dated January 22, 2020.

FA.36: Downtown Reading Signal Improvements

FOCUS AREA: Freeway and Arterial Operations

PRIORITY: Normal

PROJECT DESCRIPTION AND SCOPE: Upgrade signalized corridors in the City of Reading (Berks County), including new signal controllers to allow for Automated Traffic Signal Performance Measures on some corridors. Upgrade signal equipment and update signal timings. Upgrade signals on bus routes to include Transit Signal Priority. This would include approximately 70 signalized intersections.

STAKEHOLDERS: **PennDOT 5-0**

ESTIMATED SCHEDULE: 3+ years Life Cycle: 10-15 years	**ESTIMATED COSTS:** $$$ ($2M-$10M)

PROJECT TYPE: Deployment **LEVEL OF EFFORT:** Moderate

TECHNOLOGY COMPONENTS *(if applicable)*: Traffic Signal Systems

PREREQUISITES AND DEPENDENCIES: N/A

PERFORMANCE MEASURES: Improved Travel Time Ratio; Increased Bus Speeds; Increased Bus Ridership

BENEFITS: Improved traffic flow and reduced congestion along important signalized corridors that run through the City of Reading. Increase speed and reliability of transit service to encourage positive mode shift.

OTHER CONSIDERATIONS AND ISSUES: N/A

FA.37: Wernersville-Sinking Spring Signal Improvements

FOCUS AREA: Freeway and Arterial Operations

PRIORITY: Normal

PROJECT DESCRIPTION AND SCOPE: Upgrade signal equipment and update signal timing along US 422 corridor (Berks County). This would include approximately 20 signalized intersections.

STAKEHOLDERS: **PennDOT 5-0**

ESTIMATED SCHEDULE: 3+ years Life Cycle: 10-15 years	**ESTIMATED COSTS:** $$$ ($2M-$10M)

PROJECT TYPE: Deployment **LEVEL OF EFFORT:** Moderate

TECHNOLOGY COMPONENTS *(if applicable)*: Traffic Signal Systems

PREREQUISITES AND DEPENDENCIES: N/A

PERFORMANCE MEASURES: Improved Travel Time Ratio

BENEFITS: Improved traffic flow and reduced congestion along an important signalized corridor within the region.

OTHER CONSIDERATIONS AND ISSUES: N/A

FA.38: US 30 ICM

FOCUS AREA: Freeway and Arterial Operations

PRIORITY: Normal

PROJECT DESCRIPTION AND SCOPE: Integrated Corridor Management of US 30 in York County and parallel corridors. Installation of CCTV cameras and Type A DMS at strategic locations. Upgrade signal controllers to allow for command/control functionality. Connect PA-24 signals to PennDOT via CCTV at US 30 interchange.

STAKEHOLDERS: **PennDOT 8-0**

ESTIMATED SCHEDULE: 3+ years Life Cycle: 10-15 years	**ESTIMATED COSTS:** $$$ ($2M-$10M)

PROJECT TYPE: Deployment **LEVEL OF EFFORT:** Moderate

TECHNOLOGY COMPONENTS *(if applicable)*: Traffic Signal Systems; CCTV System; DMS System;

PREREQUISITES AND DEPENDENCIES: N/A

PERFORMANCE MEASURES: Reduced Bottleneck Delay Surrogate; Improved Travel Time Ratio

BENEFITS: Improving incident management and operations on parallel corridors, optimizing available capacity on US 30 and parallel corridors.

OTHER CONSIDERATIONS AND ISSUES: N/A

MC.01: LVPC Walk/Roll Bicycle Commuting Corridors

FOCUS AREA: Multimodal Connectivity

PRIORITY: High

PROJECT DESCRIPTION AND SCOPE: Provide safe, connected bike network infrastructure along the following corridors in Lehigh and Northampton Counties:

- Hamilton St. (Ott St. to Sixth St.)
- Liberty St. (Cedar Crest Blvd. to Fourth St.)
- Hamilton St./Hamilton Ave. (Sixth St. to Eaton Ave.)

STAKEHOLDERS: **LVPC**, PennDOT 5-0

ESTIMATED SCHEDULE: 1-3 years Life Cycle: 5-10 years	**ESTIMATED COSTS:** $ (<$500k)

PROJECT TYPE: Deployment **LEVEL OF EFFORT:** Moderate

TECHNOLOGY COMPONENTS *(if applicable)*: N/A

PREREQUISITES AND DEPENDENCIES: N/A

PERFORMANCE MEASURES: Reduced Bottleneck Delay Surrogate; Improved Travel Time Ratio; Increased Bike Usage

BENEFITS: Positively impact mode share by encouraging increase in cycling through improved infrastructure.

OTHER CONSIDERATIONS AND ISSUES: Refer to LVPC Walk/Roll plan for complete details on these projects and for other recommended multimodal infrastructure needs and potential projects.

MC.02: LANTA Enhanced Bus Service

FOCUS AREA: Multimodal Connectivity

PRIORITY: High

PROJECT DESCRIPTION AND SCOPE: Support LANTA's Enhanced Bus Service project (Lehigh/Northampton Counties). Install transit priority improvements along the proposed corridors, including Transit Signal Priority, bus lanes, queue jumps, and/or curb bumpouts. Consider development of Park & Ride lots at termini of routes.

STAKEHOLDERS: **LANTA**, PennDOT 5-0, LVPC

ESTIMATED SCHEDULE: 3+ years Life Cycle: 5-10 years	**ESTIMATED COSTS:** $ (<$500k)

PROJECT TYPE: Deployment **LEVEL OF EFFORT:** Moderate

TECHNOLOGY COMPONENTS *(if applicable)*: Traffic Signal Systems

PREREQUISITES AND DEPENDENCIES: N/A

PERFORMANCE MEASURES: Reduced Bottleneck Delay Surrogate; Increased Bus Speeds; Increased Bus Ridership

BENEFITS: Positively impact mode share by improving transit operations on key corridors in the Lehigh Valley.

OTHER CONSIDERATIONS AND ISSUES: Refer to LANTA's Lehigh Valley Enhanced Bus/BRT Study for further detail on the project.

MC.03: Lancaster Active Transportation Short-Term Priority Projects

FOCUS AREA: Multimodal Connectivity

PRIORITY: Normal

PROJECT DESCRIPTION AND SCOPE: Provide safe, connected bike network infrastructure along the following corridors and intersections in the City of Lancaster:

- Prince St.-James St. intersection
- Walnut and Chestnut St. Separated Bike Lanes
- Farnum-Duke Connection
- Christian St. Bike Boulevard

STAKEHOLDERS: **City of Lancaster**, PennDOT 8-0

ESTIMATED SCHEDULE: 1-3 years Life Cycle: 5-10 years	**ESTIMATED COSTS:** $ (<$500k)

PROJECT TYPE: Deployment **LEVEL OF EFFORT:** Moderate

TECHNOLOGY COMPONENTS *(if applicable)*: N/A

PREREQUISITES AND DEPENDENCIES: N/A

PERFORMANCE MEASURES: Reduced Bottleneck Delay Surrogate; Improved Travel Time Ratio; Increased Bike Usage

BENEFITS: Positively impact mode share by encouraging increase in cycling through improved infrastructure.

OTHER CONSIDERATIONS AND ISSUES: Refer to Lancaster Active Transportation Plan for complete details on these projects and for other recommended multimodal infrastructure needs and potential projects.

MC.04: Lehigh Valley Bike Share

FOCUS AREA: Multimodal Connectivity

PRIORITY: Normal

PROJECT DESCRIPTION AND SCOPE: Develop comprehensive bike share system for the Lehigh Valley (Lehigh/Northampton Counties). Consider use of e-assist bicycles.

STAKEHOLDERS: **LVPC**, City governments of Allentown, Bethlehem, and Easton

ESTIMATED SCHEDULE: 1-3 years Life Cycle: 3-5 years	**ESTIMATED COSTS:** $ (<$500k)

PROJECT TYPE: Deployment **LEVEL OF EFFORT:** Moderate

TECHNOLOGY COMPONENTS *(if applicable)*: Bike Share System

PREREQUISITES AND DEPENDENCIES: N/A

PERFORMANCE MEASURES: Bike Share Ridership

BENEFITS: Positively impact mode share by introducing new multimodal option. Provide first/last mile option to help reduce short single occupant vehicle trips and improve connections to transit service.

OTHER CONSIDERATIONS AND ISSUES: N/A

MC.05: Harrisburg Transit Connections

FOCUS AREA: Multimodal Connectivity

PRIORITY: Normal

PROJECT DESCRIPTION AND SCOPE: Bus stop and pedestrian infrastructure improvements along key transit routes in Dauphin and Cumberland Counties:

- Market St./Carlisle Pk.
- Main St./Simpson Ferry Rd.
- Trindle Rd. (PA-641)

STAKEHOLDERS: **Harrisburg MPO**, CAT, PennDOT 8-0

ESTIMATED SCHEDULE: 1-3 years Life Cycle: 5-10 years	**ESTIMATED COSTS:** $ (<$500k)

PROJECT TYPE: Deployment **LEVEL OF EFFORT:** Moderate

TECHNOLOGY COMPONENTS *(if applicable)*: N/A

PREREQUISITES AND DEPENDENCIES: N/A

PERFORMANCE MEASURES: Reduced Bottleneck Delay Surrogate; Increased Bus Ridership

BENEFITS: Positively impact mode share by improving connections to transit on key routes.

OTHER CONSIDERATIONS AND ISSUES: Coordinate with in progress CAT bus network redesign.

MC.06: Harrisburg Transit Priority

FOCUS AREA: Multimodal Connectivity

PRIORITY: Normal

PROJECT DESCRIPTION AND SCOPE: Bus stop and pedestrian infrastructure improvements as well as implementation of transit priority improvements such as Transit Signal Priority, bus lanes, queue jumps, and curb bumpouts on key routes in the City of Harrisburg: State St., Market St., 3rd St., 6th St., Derry St.

STAKEHOLDERS: **Harrisburg MPO**, CAT, PennDOT 8-0

ESTIMATED SCHEDULE: 1-3 years Life Cycle: 5-10 years	**ESTIMATED COSTS:** $$ ($500k-$2M)

PROJECT TYPE: Deployment **LEVEL OF EFFORT:** Moderate

TECHNOLOGY COMPONENTS *(if applicable)*: N/A

PREREQUISITES AND DEPENDENCIES: N/A

PERFORMANCE MEASURES: Reduced Bottleneck Delay Surrogate; Increased Bus Speeds; Increased Bus Ridership

BENEFITS: Positively impact mode share by improving connections to transit and improving speed and reliability of service.

OTHER CONSIDERATIONS AND ISSUES: Coordinate with in progress CAT bus network redesign.

MC.07: LVPC Walk/Roll Catalytic Projects

FOCUS AREA: Multimodal Connectivity

PRIORITY: Normal

PROJECT DESCRIPTION AND SCOPE: Provide safe, connected bike network infrastructure along the following corridors and trails in Lehigh and Northampton Counties:

- D&L National Heritage Corridor
- 7th St./MacArthur Rd. Multimodal Improvements
- Complete Broad Street

STAKEHOLDERS: **LVPC**, PennDOT 5-0

ESTIMATED SCHEDULE: 3+ years Life Cycle: 5-10 years	**ESTIMATED COSTS:** $$ ($500k-$2M)

PROJECT TYPE: Deployment **LEVEL OF EFFORT:** Moderate

TECHNOLOGY COMPONENTS *(if applicable)*: N/A

PREREQUISITES AND DEPENDENCIES: N/A

PERFORMANCE MEASURES: Reduced Bottleneck Delay Surrogate; Improved Travel Time Ratio; Increased Bike Usage

BENEFITS: Positively impact mode share by encouraging increase in cycling through improved infrastructure.

OTHER CONSIDERATIONS AND ISSUES: Refer to LVPC Walk/Roll plan for complete details on these projects and for other recommended multimodal infrastructure needs and potential projects.

MC.08: Wescosville Park & Ride Improvements

FOCUS AREA: Multimodal Connectivity

PRIORITY: Normal

PROJECT DESCRIPTION AND SCOPE: Capacity expansion of Wescosville Park & Ride (Lehigh County). Possible installation of Smart Parking System. Provide notification of parking information on adjacent corridors such as I-78 and US 222, either through existing DMS signs or proposed signs if needed.

STAKEHOLDERS: **PennDOT 5-0**, LVPC

ESTIMATED SCHEDULE: 3+ years Life Cycle: 10-15 years	**ESTIMATED COSTS:** $$ ($500k-$2M)

PROJECT TYPE: Deployment **LEVEL OF EFFORT:** Moderate

TECHNOLOGY COMPONENTS *(if applicable)*: Smart Parking System; DMS System

PREREQUISITES AND DEPENDENCIES: N/A

PERFORMANCE MEASURES: Reduced Bottleneck Delay Surrogate; Improved Travel Time Ratio; Increased Usage of Park-n-Ride

BENEFITS: Positively impact mode share by encouraging drivers to park and utilize buses in and out of congested Lehigh Valley area.

OTHER CONSIDERATIONS AND ISSUES: N/A

TIM.01: District 5-0 Curve Warning

FOCUS AREA: Traffic Incident Management

PRIORITY: High

PROJECT DESCRIPTION AND SCOPE: Install Dynamic Curve Warning systems at the following locations with histories of high curved road crash rates:

- I-81 near MM 108
- I-80 MM 244-247
- I-80/380 interchange

STAKEHOLDERS: **PennDOT 5-0**

ESTIMATED SCHEDULE: 1-3 years Life Cycle: 10-15 years	**ESTIMATED COSTS:** $ (<$500k)

PROJECT TYPE: Deployment **LEVEL OF EFFORT:** Moderate

TECHNOLOGY COMPONENTS *(if applicable)*: Dynamic Curve Warning System; DMS System

PREREQUISITES AND DEPENDENCIES: N/A

PERFORMANCE MEASURES: Reduced Curved Road Crash Rate

BENEFITS: Reduce crashes, particularly at high speeds, in locations with histories of high curved road crash rates.

OTHER CONSIDERATIONS AND ISSUES: N/A

TIM.02: Berks Freeway Service Patrol

FOCUS AREA: Traffic Incident Management

PRIORITY: High

PROJECT DESCRIPTION AND SCOPE: Expand hours of existing Freeway Service Patrol in Berks County. Expand coverage area to include US 222.

STAKEHOLDERS: **PennDOT 5-0**

ESTIMATED SCHEDULE: 1 year Life Cycle: N/A	**ESTIMATED COSTS:** $ (<$500k)

PROJECT TYPE: Deployment **LEVEL OF EFFORT:** Simple

TECHNOLOGY COMPONENTS *(if applicable)*: N/A

PREREQUISITES AND DEPENDENCIES: N/A

PERFORMANCE MEASURES: Improved Incident Response Time; Improved Incident Clearance Time; Reduction in Secondary Crashes

BENEFITS: Expanded hours and coverage to improve response and cleanup of incidents in Bucks County, improving safety and minimizing chances of secondary crashes.

OTHER CONSIDERATIONS AND ISSUES: N/A

TIM.03: I-81 Freeway Service Patrol

FOCUS AREA: Traffic Incident Management

PRIORITY: High

PROJECT DESCRIPTION AND SCOPE: Expand coverage of existing Freeway Service Patrol south to include Carlisle and north to I-78. Also include Franklin County coverage in the vicinity of US 30 as part of this Freeway Service Patrol or as a separate patrol.

STAKEHOLDERS: **PennDOT 8-0**, Harrisburg MPO, Franklin County MPO

ESTIMATED SCHEDULE: 1 year Life Cycle: N/A	**ESTIMATED COSTS:** $ (<$500k)

PROJECT TYPE: Deployment **LEVEL OF EFFORT:** Simple

TECHNOLOGY COMPONENTS *(if applicable)*: N/A

PREREQUISITES AND DEPENDENCIES: N/A

PERFORMANCE MEASURES: Improved Incident Response Time; Improved Incident Clearance Time; Reduction in Secondary Crashes

BENEFITS: Expanded coverage to improve response and cleanup of incidents on I-81 corridor, improving safety and minimizing chances of secondary crashes.

OTHER CONSIDERATIONS AND ISSUES: N/A

TIM.04: South Central Freeway Service Patrol

FOCUS AREA: Traffic Incident Management

PRIORITY: High

PROJECT DESCRIPTION AND SCOPE: Develop Freeway Service Patrol to cover US 30 corridor between York and Lancaster, as well as I-83, US 222, and PA-283.

STAKEHOLDERS: **PennDOT 8-0**, York MPO, Lancaster MPO

ESTIMATED SCHEDULE: 1 year Life Cycle: N/A	**ESTIMATED COSTS:** $ (<$500k)

PROJECT TYPE: Deployment **LEVEL OF EFFORT:** Simple

TECHNOLOGY COMPONENTS *(if applicable)*: N/A

PREREQUISITES AND DEPENDENCIES: N/A

PERFORMANCE MEASURES: Improved Incident Response Time; Improved Incident Clearance Time; Reduction in Secondary Crashes

BENEFITS: Expanded coverage to improve response and cleanup of incidents on key corridors in York and Lancaster Counties, improving safety and minimizing chances of secondary crashes.

OTHER CONSIDERATIONS AND ISSUES: N/A

TIM.05: I-81 Safety Systems

FOCUS AREA: Traffic Incident Management

PRIORITY: High

PROJECT DESCRIPTION AND SCOPE: Install Dynamic Curve Warning system and Bridge De-Icing System at Exit 206. Install Dynamic Curve Warning systems at Exits 211 and 223. All project locations in Susquehanna County.

STAKEHOLDERS: **PennDOT 4-0**

ESTIMATED SCHEDULE: 1-3 years Life Cycle: 10-15 years	**ESTIMATED COSTS:** $$ ($500k-$2M)

PROJECT TYPE: Deployment **LEVEL OF EFFORT:** Moderate

TECHNOLOGY COMPONENTS *(if applicable)*: Dynamic Curve Warning System; DMS System; Bridge De-Icing System

PREREQUISITES AND DEPENDENCIES: N/A

PERFORMANCE MEASURES: Reduced Curved Road Crash Rate; Reduced Winter Crash Rate

BENEFITS: Reduce crashes, particularly at high speeds, in locations with histories of high curved road crash rates. Reduce crashes on bridge due to winter conditions.

OTHER CONSIDERATIONS AND ISSUES: N/A

TIM.06: US 222/US 422 Curve Warning

Focus Area: Traffic Incident Management

Priority: High

Project Description and Scope: Install Dynamic Curve Warning systems on US 222 ramps at US 422 interchange and US 222 northbound ramp at Business US 222 (Berks County).

Stakeholders: **PennDOT 5-0**

Estimated Schedule: 1-3 years Life Cycle: 10-15 years	**Estimated Costs:** $$ ($500k-$2M)

Project Type: Deployment **Level of Effort:** Moderate

Technology Components *(if applicable)*: Dynamic Curve Warning System; DMS System

Prerequisites and Dependencies: N/A

Performance Measures: Reduced Curved Road Crash Rate

Benefits: Reduce crashes, particularly at high speeds, in locations with histories of high curved road crash rates.

Other Considerations and Issues: N/A

TIM.07: Wilkes-Barre/Scranton Freeway Service Patrol

FOCUS AREA: Traffic Incident Management

PRIORITY: Normal

PROJECT DESCRIPTION AND SCOPE: Develop Freeway Service Patrol to cover I-81 and parallel corridors (Luzerne/Lackawanna Counties).

STAKEHOLDERS: **PennDOT 4-0**, Lackawanna/Luzerne MPO

ESTIMATED SCHEDULE: 1 year Life Cycle: N/A	**ESTIMATED COSTS:** $ (<$500k)

PROJECT TYPE: Deployment **LEVEL OF EFFORT:** Simple

TECHNOLOGY COMPONENTS *(if applicable)*: N/A

PREREQUISITES AND DEPENDENCIES: N/A

PERFORMANCE MEASURES: Improved Incident Response Time; Improved Incident Clearance Time; Reduction in Secondary Crashes

BENEFITS: Expanded coverage to improve response and cleanup of incidents along I-81 corridor, improving safety and minimizing chances of secondary crashes.

OTHER CONSIDERATIONS AND ISSUES: N/A

TIM.08: Wilkes-Barre/Scranton TIM Team

FOCUS AREA: Traffic Incident Management

PRIORITY: Normal

PROJECT DESCRIPTION AND SCOPE: Develop TIM Team to cover I-81 and parallel corridors, I-84, I-380, US 6, and Northeast Extension in Wilkes-Barre/Scranton area (Luzerne/Lackawanna Counties).

STAKEHOLDERS: **Lackawanna/Luzerne MPO**; PennDOT 4-0; Local Municipalities; Emergency Personnel

ESTIMATED SCHEDULE: 1 year Life Cycle: N/A	**ESTIMATED COSTS:** $ (<$500k)

PROJECT TYPE: Planning **LEVEL OF EFFORT:** Simple

TECHNOLOGY COMPONENTS *(if applicable)*: N/A

PREREQUISITES AND DEPENDENCIES: N/A

PERFORMANCE MEASURES: Improved Inter-Agency Communications; Improved Incident Response Time; Improved Incident Clearance Time; Reduction in Secondary Crashes

BENEFITS: Improved incident management and coordination, increasing safety for motorists and emergency responders.

OTHER CONSIDERATIONS AND ISSUES: N/A

TIM.09: Lehigh Valley Freeway Service Patrol

FOCUS AREA: Traffic Incident Management

PRIORITY: Normal

PROJECT DESCRIPTION AND SCOPE: Continued development of existing Freeway Service Patrol to include expanded hours, expanded number of trucks, and expanded coverage to include PA-33 (Lehigh/Northampton Counties).

STAKEHOLDERS: **PennDOT 5-0**, LVPC

ESTIMATED SCHEDULE: 1 year Life Cycle: N/A	**ESTIMATED COSTS:** $ (<$500k)

PROJECT TYPE: Deployment **LEVEL OF EFFORT:** Simple

TECHNOLOGY COMPONENTS *(if applicable)*: N/A

PREREQUISITES AND DEPENDENCIES: N/A

PERFORMANCE MEASURES: Improved Incident Response Time; Improved Incident Clearance Time; Reduction in Secondary Crashes

BENEFITS: Expanded coverage to improve response and cleanup of incidents in the Lehigh Valley, improving safety and minimizing chances of secondary crashes.

OTHER CONSIDERATIONS AND ISSUES: N/A

TIM.10: Lehigh Valley TIM Team

FOCUS AREA: Traffic Incident Management

PRIORITY: Normal

PROJECT DESCRIPTION AND SCOPE: Develop TIM Team to cover I-78 and US 22 corridors in Lehigh Valley (Lehigh/Northampton Counties).

STAKEHOLDERS: **Lehigh Valley EMA**; LVPC; PennDOT 5-0; Local Municipalities; Emergency Personnel

ESTIMATED SCHEDULE: 1 year Life Cycle: N/A	**ESTIMATED COSTS:** $ (<$500k)

PROJECT TYPE: Planning **LEVEL OF EFFORT:** Simple

TECHNOLOGY COMPONENTS *(if applicable)*: N/A

PREREQUISITES AND DEPENDENCIES: N/A

PERFORMANCE MEASURES: Improved Inter-Agency Communications; Improved Incident Response Time; Improved Incident Clearance Time; Reduction in Secondary Crashes

BENEFITS: Improved incident management and coordination, increasing safety for motorists and emergency responders.

OTHER CONSIDERATIONS AND ISSUES: N/A

TIM.11: Reading TIM Team

FOCUS AREA: Traffic Incident Management

PRIORITY: Normal

PROJECT DESCRIPTION AND SCOPE: Develop TIM Team to cover I-78 and the Reading area (Berks County).

STAKEHOLDERS: **Reading MPO**; PennDOT 5-0; Local Municipalities; Emergency Personnel

ESTIMATED SCHEDULE: 1 year Life Cycle: N/A	**ESTIMATED COSTS:** $ (<$500k)

PROJECT TYPE: Planning **LEVEL OF EFFORT:** Simple

TECHNOLOGY COMPONENTS *(if applicable)*: N/A

PREREQUISITES AND DEPENDENCIES: N/A

PERFORMANCE MEASURES: Improved Inter-Agency Communications; Improved Incident Response Time; Improved Incident Clearance Time; Reduction in Secondary Crashes

BENEFITS: Improved incident management and coordination, increasing safety for motorists and emergency responders.

OTHER CONSIDERATIONS AND ISSUES: N/A

TIM.12: South Central TIM Team

FOCUS AREA: Traffic Incident Management

PRIORITY: Normal

PROJECT DESCRIPTION AND SCOPE: Develop TIM Team to cover US 30 corridor from Chambersburg to Lancaster, as well as I-83 and the vicinities of York and Lancaster.

STAKEHOLDERS: **PennDOT 8-0**; Planning Partners; Local Municipalities; Emergency Personnel

ESTIMATED SCHEDULE: 1 year Life Cycle: N/A	**ESTIMATED COSTS:** $ (<$500k)

PROJECT TYPE: Planning **LEVEL OF EFFORT:** Simple

TECHNOLOGY COMPONENTS *(if applicable)*: N/A

PREREQUISITES AND DEPENDENCIES: N/A

PERFORMANCE MEASURES: Improved Inter-Agency Communications; Improved Incident Response Time; Improved Incident Clearance Time; Reduction in Secondary Crashes

BENEFITS: Improved incident management and coordination, increasing safety for motorists and emergency responders.

OTHER CONSIDERATIONS AND ISSUES: N/A

TIM.13: District 8-0 Curve Warning

FOCUS AREA: Traffic Incident Management

PRIORITY: Normal

PROJECT DESCRIPTION AND SCOPE: Install Dynamic Curve Warning systems on US 22/322 near Midway, PA-72 (Ebenezer Rd.) near Thompson Ave., and I-81 MM 93 (Lebanon County).

STAKEHOLDERS: **PennDOT 8-0**

ESTIMATED SCHEDULE: 1-3 years Life Cycle: 10-15 years	**ESTIMATED COSTS:** $ (<$500k)

PROJECT TYPE: Deployment **LEVEL OF EFFORT:** Moderate

TECHNOLOGY COMPONENTS *(if applicable)*: Dynamic Curve Warning System; DMS System

PREREQUISITES AND DEPENDENCIES: N/A

PERFORMANCE MEASURES: Reduced Curved Road Crash Rate

BENEFITS: Reduce crashes, particularly at high speeds, in locations with histories of high curved road crash rates.

OTHER CONSIDERATIONS AND ISSUES: N/A

TIM.14: I-81 Emergency Access

FOCUS AREA: Traffic Incident Management

PRIORITY: Normal

PROJECT DESCRIPTION AND SCOPE: Construct median crossovers and emergency access points along I-81 from New Milford to Great Bend (Susquehanna County).

STAKEHOLDERS: **PennDOT 4-0**

ESTIMATED SCHEDULE: 1-3 years Life Cycle: 10-15 years	**ESTIMATED COSTS:** $$ ($500k-$2M)

PROJECT TYPE: Deployment **LEVEL OF EFFORT:** Moderate

TECHNOLOGY COMPONENTS *(if applicable)*: N/A

PREREQUISITES AND DEPENDENCIES: N/A

PERFORMANCE MEASURES: Reduced Incident Response Time; Reduced Incident Clearance Time

BENEFITS: Provide improved access for emergency vehicles to access incidents and allow easier relief of trapped queues along northern section of I-81 corridor.

OTHER CONSIDERATIONS AND ISSUES: N/A

TIM.15: District 8-0 Bridge De-Icing

FOCUS AREA: Traffic Incident Management

PRIORITY: Normal

PROJECT DESCRIPTION AND SCOPE: Install bridge de-icing systems on I-81/I-83 flyover ramps (Dauphin County) and I-83 over the Conewago Creek (York County).

STAKEHOLDERS: **PennDOT 8-0**

ESTIMATED SCHEDULE: 1-3 years Life Cycle: 10-15 years	**ESTIMATED COSTS:** $$ ($500k-$2M)

PROJECT TYPE: Deployment **LEVEL OF EFFORT:** Moderate

TECHNOLOGY COMPONENTS *(if applicable)*: Bridge De-Icing System

PREREQUISITES AND DEPENDENCIES: N/A

PERFORMANCE MEASURES: Reduced Winter Weather Crashes

BENEFITS: Improving safety and reducing incidents on bridge structures with known winter weather-related crash histories.

OTHER CONSIDERATIONS AND ISSUES: N/A

TIM.16: US 15 Corridor Incident Management

FOCUS AREA: Traffic Incident Management

PRIORITY: Normal

PROJECT DESCRIPTION AND SCOPE: Establish TIM Team for US 15 corridor in Adams County. Construct median crossovers. Implement improvements to parallel routes.

STAKEHOLDERS: **PennDOT 8-0**

ESTIMATED SCHEDULE: 3+ years Life Cycle: 10-15 years	**ESTIMATED COSTS:** $$ ($500k-$2M)

PROJECT TYPE: Deployment **LEVEL OF EFFORT:** Moderate

TECHNOLOGY COMPONENTS *(if applicable)*: N/A

PREREQUISITES AND DEPENDENCIES: N/A

PERFORMANCE MEASURES: Reduced Incident Response Time; Reduced Incident Clearance Time

BENEFITS: Provide easier relief of trapped queues along US 15 corridor. Provide improved incident management and coordination, particularly during detour events.

OTHER CONSIDERATIONS AND ISSUES: Coordinate incident management and improvements with Maryland SHA.

TI.01: District 4-0 ITS Gaps

FOCUS AREA: Traveler Information

PRIORITY: High

PROJECT DESCRIPTION AND SCOPE: Install Type A DMS on PA-309 near Mountain Top (Luzerne County) and on Montage Mountain near I-81 (Lackawanna County).

STAKEHOLDERS: **PennDOT 4-0**

ESTIMATED SCHEDULE: 1-3 years Life Cycle: 10-15 years	**ESTIMATED COSTS:** $$ ($500k-$2M)

PROJECT TYPE: Deployment **LEVEL OF EFFORT:** Moderate

TECHNOLOGY COMPONENTS *(if applicable)*: DMS System

PREREQUISITES AND DEPENDENCIES: N/A

PERFORMANCE MEASURES: Reduced Travel Time Ratio

BENEFITS: Improve traveler information at key locations in PennDOT District 4-0.

OTHER CONSIDERATIONS AND ISSUES: N/A

TI.02: I-84 Corridor ITS

FOCUS AREA: Traveler Information

PRIORITY: High

PROJECT DESCRIPTION AND SCOPE: Install CCTV cameras, DMS, and RWIS at key locations along I-84 corridor (Pike County).

STAKEHOLDERS: **PennDOT 4-0**

ESTIMATED SCHEDULE: 1-3 years Life Cycle: 10-15 years	**ESTIMATED COSTS:** $$ ($500k-$2M)

PROJECT TYPE: Deployment **LEVEL OF EFFORT:** Moderate

TECHNOLOGY COMPONENTS *(if applicable)*: CCTV System; DMS System; RWIS System

PREREQUISITES AND DEPENDENCIES: N/A

PERFORMANCE MEASURES: Reduced Travel Time Ratio; Improved Incident Response Time; Reduced Winter Weather Crashes;

BENEFITS: Improve incident response, congestion monitoring, and traveler information along I-84 Corridor. Improve monitoring of weather and roadway conditions, particularly during winter weather. Improve plowing and winter maintenance response.

OTHER CONSIDERATIONS AND ISSUES: N/A

TI.03: Susquehanna County ITS Gaps

FOCUS AREA: Traveler Information

PRIORITY: High

PROJECT DESCRIPTION AND SCOPE: Install CCTV cameras and DMS at key locations along I-81 and adjacent US 11 corridor in Susquehanna County.

STAKEHOLDERS: **PennDOT 4-0**

ESTIMATED SCHEDULE: 1-3 years Life Cycle: 10-15 years	**ESTIMATED COSTS:** $$ ($500k-$2M)

PROJECT TYPE: Deployment **LEVEL OF EFFORT:** Moderate

TECHNOLOGY COMPONENTS *(if applicable)*: CCTV System; DMS System

PREREQUISITES AND DEPENDENCIES: N/A

PERFORMANCE MEASURES: Reduced Travel Time Ratio; Improved Incident Response Time

BENEFITS: Improve incident response, congestion monitoring, and traveler information along I-81 Corridor. Improve monitoring of weather and roadway conditions.

OTHER CONSIDERATIONS AND ISSUES: N/A

TI.04: D8 Interstate CCTV Gaps

Focus Area: Traveler Information

Priority: High

Project Description and Scope: Install CCTV cameras at the following locations in District 8-0:

- I-78 MM 2
- I-81 MM 48, 56, 66, 69, and 76
- I-283 MM 1.5
- I-83 MM 2, 10, 12, 15, 17, 26, and 38

Stakeholders: **PennDOT 8-0**

Estimated Schedule: 1-3 years Life Cycle: 10-15 years	**Estimated Costs:** $$ ($500k-$2M)

Project Type: Deployment **Level of Effort:** Moderate

Technology Components *(if applicable)*: CCTV System

Prerequisites and Dependencies: N/A

Performance Measures: Improved Incident Response Time

Benefits: Improve incident response, congestion monitoring, and traveler information along key interstate corridors in PennDOT District 8-0.

Other Considerations and Issues: See TSMO Funding FFY 2021 waitlist project application for further information.

TI.05: D8 Interstate DMS Gaps

FOCUS AREA: Traveler Information

PRIORITY: High

PROJECT DESCRIPTION AND SCOPE: Install DMS at the following locations in District 8-0:

- I-81 SB, Exit 49
- I-81 SB, Exit 80
- I-83, MM 6

STAKEHOLDERS: **PennDOT 8-0**

ESTIMATED SCHEDULE: 1-3 years Life Cycle: 10-15 years	**ESTIMATED COSTS:** $$ ($500k-$2M)

PROJECT TYPE: Deployment **LEVEL OF EFFORT:** Moderate

TECHNOLOGY COMPONENTS *(if applicable)*: DMS System

PREREQUISITES AND DEPENDENCIES: N/A

PERFORMANCE MEASURES: Reduced Travel Time Ratio

BENEFITS: Improve traveler information along key interstate corridors in PennDOT District 8-0.

OTHER CONSIDERATIONS AND ISSUES: See TSMO Funding FFY 2021 waitlist project application for further information.

TI.06: D8 Interstate CCTV DMS Gaps

FOCUS AREA: Traveler Information

PRIORITY: High

PROJECT DESCRIPTION AND SCOPE: Install CCTV cameras on existing DMS at the following locations along I-81, I-83, and I-283 in District 8-0: D-81N-55, D-81N-58, D-81S-62, D-81N-63, D-81S-69, D-81S-71, D-83N-1, D-83N-15, D-83S-16, D-83N-20, D-83S-24, V-283N-1.

STAKEHOLDERS: **PennDOT 8-0**

ESTIMATED SCHEDULE: 1-3 years Life Cycle: 10-15 years	**ESTIMATED COSTS:** $$ ($500k-$2M)

PROJECT TYPE: Deployment **LEVEL OF EFFORT:** Moderate

TECHNOLOGY COMPONENTS *(if applicable)*: CCTV System

PREREQUISITES AND DEPENDENCIES: N/A

PERFORMANCE MEASURES: Improved Incident Response Time

BENEFITS: Improve incident response, congestion monitoring, and traveler information along key interstate corridors in PennDOT District 8-0.

OTHER CONSIDERATIONS AND ISSUES: See TSMO Funding FFY 2021 waitlist project application for further information.

TI.07: US 222 Corridor ITS

FOCUS AREA: Traveler Information

PRIORITY: High

PROJECT DESCRIPTION AND SCOPE: Install CCTV cameras and DMS at key locations along US 222 in Berks County.

STAKEHOLDERS: **PennDOT 5-0**

ESTIMATED SCHEDULE: 3+ years Life Cycle: 10-15 years	**ESTIMATED COSTS:** $$ ($500k-$2M)

PROJECT TYPE: Deployment **LEVEL OF EFFORT:** Moderate

TECHNOLOGY COMPONENTS *(if applicable)*: CCTV System; DMS System

PREREQUISITES AND DEPENDENCIES: N/A

PERFORMANCE MEASURES: Reduced Travel Time Ratio; Improved Incident Response Time

BENEFITS: Improve incident response, congestion monitoring, and traveler information along US 222 Corridor. Improve monitoring of weather and roadway conditions.

OTHER CONSIDERATIONS AND ISSUES: Coordinate ITS deployment with US 222 construction projects.

TI.08: District 5-0 CCTV Gaps

FOCUS AREA: Traveler Information

PRIORITY: High

PROJECT DESCRIPTION AND SCOPE: Install CCTV cameras at the following locations in District 5-0:

- I-81 MM 100, 104, 112, 116, 131, 138
- I-78 MM 13, 16, 17, 23, 29, 38, 43, 45, 47.9, 59, 63, 65, 68, 70, 74
- I-176 MM 2, 5, 7, 9, 10
- I-80 MM 284, 295, 297, 300.5
- I-380 MM 7, 13

STAKEHOLDERS: **PennDOT 5-0**

ESTIMATED SCHEDULE: 3+ years Life Cycle: 10-15 years	**ESTIMATED COSTS:** $$$ ($2M-$10M)

PROJECT TYPE: Deployment **LEVEL OF EFFORT:** Moderate

TECHNOLOGY COMPONENTS *(if applicable)*: CCTV System

PREREQUISITES AND DEPENDENCIES: N/A

PERFORMANCE MEASURES: Improved Incident Response Time

BENEFITS: Improve incident response, congestion monitoring, and traveler information along key interstate corridors in PennDOT District 5-0.

OTHER CONSIDERATIONS AND ISSUES: See District 5-0 2019 Interstate Priorities for more information.

TI.09: District 5-0 DMS Gaps

FOCUS AREA: Traveler Information

PRIORITY: High

PROJECT DESCRIPTION AND SCOPE: Install DMS at the following locations in District 5-0:

- I-81: NB MM 104-107, NB MM 111, NB MM 122-123, SB MM 108, SB MM 117
- I-78: EB Exit 19 and 23, WB MM 37, EB MM 54-58, WB MM 63, EB MM 72
- I-176: SB MM 10.5 (replace HAB), NB MM 8

STAKEHOLDERS: **PennDOT 5-0**

ESTIMATED SCHEDULE: 3+ years Life Cycle: 10-15 years	**ESTIMATED COSTS:** $$$ ($2M-$10M)

PROJECT TYPE: Deployment **LEVEL OF EFFORT:** Moderate

TECHNOLOGY COMPONENTS *(if applicable)*: DMS System

PREREQUISITES AND DEPENDENCIES: N/A

PERFORMANCE MEASURES: Reduced Travel Time Ratio

BENEFITS: Improve traveler information along key interstate corridors in PennDOT District 5-0.

OTHER CONSIDERATIONS AND ISSUES: See District 5-0 2019 Interstate Priorities for more information.

TI.10: District 5-0 Replace Existing Portable CMS

FOCUS AREA: Traveler Information

PRIORITY: High

PROJECT DESCRIPTION AND SCOPE: Replace existing CMS with DMS at the following locations in District 5-0:

- I-81 MM 91.5, 113 SB, 130 NB
- I-80 MM 290.5 EB
- I-380 MM 1.4 NB, 13.5 SB
- PA-61 NB/SB at I-78
- I-78 MM 14-22 (two signs)

STAKEHOLDERS: **PennDOT 5-0**

ESTIMATED SCHEDULE: 3+ years Life Cycle: 10-15 years	**ESTIMATED COSTS:** $$ ($500k-$2M)

PROJECT TYPE: Deployment **LEVEL OF EFFORT:** Moderate

TECHNOLOGY COMPONENTS *(if applicable)*: DMS System

PREREQUISITES AND DEPENDENCIES: N/A

PERFORMANCE MEASURES: Reduced Travel Time Ratio

BENEFITS: Improve traveler information along key corridors in PennDOT District 5-0.

OTHER CONSIDERATIONS AND ISSUES: See District 5-0 2019 Interstate Priorities for more information.

TI.11: D5 TMC Upgrades

FOCUS AREA: Traveler Information

PRIORITY: Normal

PROJECT DESCRIPTION AND SCOPE: Provide individual adjustable workstations for TMC operators at District 5-0.

STAKEHOLDERS: **PennDOT 5-0**

ESTIMATED SCHEDULE: 1 year Life Cycle: 10-15 years	**ESTIMATED COSTS:** $ (<$500k)

PROJECT TYPE: Deployment **LEVEL OF EFFORT:** Simple

TECHNOLOGY COMPONENTS *(if applicable)*: N/A

PREREQUISITES AND DEPENDENCIES: N/A

PERFORMANCE MEASURES: Improved Operator Satisfaction and Retention

BENEFITS: Provide more comfortable and ergonomic work environment for TMC operators.

OTHER CONSIDERATIONS AND ISSUES: N/A

TI.12: Lebanon County RWIS

FOCUS AREA: Traveler Information

PRIORITY: Normal

PROJECT DESCRIPTION AND SCOPE: Install Road Weather Information System (RWIS) on PA-501, north of the PA Turnpike in Lebanon County.

STAKEHOLDERS: **PennDOT 8-0**

ESTIMATED SCHEDULE: 1-3 years Life Cycle: 10-15 years	**ESTIMATED COSTS:** $ (<$500k)

PROJECT TYPE: Deployment **LEVEL OF EFFORT:** Moderate

TECHNOLOGY COMPONENTS *(if applicable)*: RWIS System

PREREQUISITES AND DEPENDENCIES: N/A

PERFORMANCE MEASURES: Reduced Winter Weather Crashes; Improved Incident Response Time; Improved Travel Time Ratio

BENEFITS: Improve monitoring of weather and roadway conditions, particularly during winter weather. Improve plowing and winter maintenance response.

OTHER CONSIDERATIONS AND ISSUES: N/A

TI.13: I-81/Northeast Extension Travel Times

FOCUS AREA: Traveler Information

PRIORITY: Normal

PROJECT DESCRIPTION AND SCOPE: Coordinate with the PA Turnpike to show comparative travel times between I-81 and the Northeast Extension in the Scranton area (Lackawanna County). Provide travel time messaging on existing DMS if possible or install additional DMS as needed.

STAKEHOLDERS: **PennDOT 4-0**, PA Turnpike

ESTIMATED SCHEDULE: 1-3 years Life Cycle: 10-15 years	**ESTIMATED COSTS:** $$ ($500k-$2M)

PROJECT TYPE: Deployment **LEVEL OF EFFORT:** Moderate

TECHNOLOGY COMPONENTS *(if applicable)*: DMS System

PREREQUISITES AND DEPENDENCIES: N/A

PERFORMANCE MEASURES: Reduced Travel Time Ratio

BENEFITS: Improve traveler information along I-81 and the Northeast Extension in the Scranton area. Maximize capacity of parallel interstates by encouraging further use of the northern section of the Northeast Extension.

OTHER CONSIDERATIONS AND ISSUES: Coordinate effort with PA Turnpike's Scranton Bypass projects to construct high-speed interchanges in the area.

TI.14: US 11/15 Devices

FOCUS AREA: Traveler Information

PRIORITY: Normal

PROJECT DESCRIPTION AND SCOPE: Install 3 CCTV cameras and 2 Type A DMS along the US 11/15 corridor in Perry County.

STAKEHOLDERS: **PennDOT 8-0**

ESTIMATED SCHEDULE: 1-3 years Life Cycle: 10-15 years	**ESTIMATED COSTS:** $$ ($500k-$2M)

PROJECT TYPE: Deployment **LEVEL OF EFFORT:** Moderate

TECHNOLOGY COMPONENTS *(if applicable)*: CCTV System; DMS System

PREREQUISITES AND DEPENDENCIES: N/A

PERFORMANCE MEASURES: Reduced Travel Time Ratio; Improved Incident Response Time

BENEFITS: Improve incident response, congestion monitoring, and traveler information along US 11/15 Corridor. Improve monitoring of weather and roadway conditions.

OTHER CONSIDERATIONS AND ISSUES: See TSMO Funding FFY 2021 waitlist project application for further information.

TI.15: US 22/322 Devices

FOCUS AREA: Traveler Information

PRIORITY: Normal

PROJECT DESCRIPTION AND SCOPE: Install 8 CCTV cameras and 2 DMS along the US 22/322 corridor in Dauphin and Perry Counties. Also retrofit 3 existing DMS along corridor.

STAKEHOLDERS: **PennDOT 8-0**

ESTIMATED SCHEDULE: 1-3 years Life Cycle: 10-15 years	**ESTIMATED COSTS:** $$ ($500k-$2M)

PROJECT TYPE: Deployment **LEVEL OF EFFORT:** Moderate

TECHNOLOGY COMPONENTS *(if applicable)*: CCTV System; DMS System

PREREQUISITES AND DEPENDENCIES: N/A

PERFORMANCE MEASURES: Reduced Travel Time Ratio; Improved Incident Response Time

BENEFITS: Improve incident response, congestion monitoring, and traveler information along US 22/322 Corridor. Improve monitoring of weather and roadway conditions.

OTHER CONSIDERATIONS AND ISSUES: See TSMO Funding FFY 2021 waitlist project application for further information.

TI.16: US 30 ITS

FOCUS AREA: Traveler Information

PRIORITY: Normal

PROJECT DESCRIPTION AND SCOPE: Install CCTV cameras and DMS at strategic locations along the US 30 corridor east of Lancaster. Add East Lampeter signals to command/control system.

STAKEHOLDERS: **PennDOT 8-0**

ESTIMATED SCHEDULE: 1-3 years Life Cycle: 10-15 years	**ESTIMATED COSTS:** $$ ($500k-$2M)

PROJECT TYPE: Deployment **LEVEL OF EFFORT:** Moderate

TECHNOLOGY COMPONENTS *(if applicable)*: CCTV System; DMS System; Traffic Signal Systems

PREREQUISITES AND DEPENDENCIES: N/A

PERFORMANCE MEASURES: Reduced Travel Time Ratio; Improved Incident Response Time

BENEFITS: Improve incident response, congestion monitoring, and traveler information along US 30 Corridor. Improve monitoring of weather and roadway conditions. Improve traffic flow through signalized intersections.

OTHER CONSIDERATIONS AND ISSUES: N/A

TI.17: District 8-0 DMS Interstate Approach Gaps

FOCUS AREA: Traveler Information

PRIORITY: Normal

PROJECT DESCRIPTION AND SCOPE: Install Type A DMS at pre-entry locations prior to limited-access roadways in District 8-0.

STAKEHOLDERS: **PennDOT 8-0**

ESTIMATED SCHEDULE: 1-3 years Life Cycle: 10-15 years	**ESTIMATED COSTS:** $$ ($500k-$2M)

PROJECT TYPE: Deployment **LEVEL OF EFFORT:** Moderate

TECHNOLOGY COMPONENTS *(if applicable)*: DMS System

PREREQUISITES AND DEPENDENCIES: N/A

PERFORMANCE MEASURES: Reduced Travel Time Ratio

BENEFITS: Improve traveler information on approaches to key interstate junctions in PennDOT District 8-0. Signs can be used to alert drivers about congestion, incidents, and closures on the interstate and allow them to reroute and avoid potential issues.

OTHER CONSIDERATIONS AND ISSUES: See District 8-0 Interstate Priorities for more information.

TI.18: Dillsburg ITS

FOCUS AREA: Traveler Information

PRIORITY: Normal

PROJECT DESCRIPTION AND SCOPE: Install two CCTV cameras and one DMS on US 15 corridor in York County.

STAKEHOLDERS: **PennDOT 8-0**

ESTIMATED SCHEDULE: 1-3 years Life Cycle: 10-15 years	**ESTIMATED COSTS:** $$ ($500k-$2M)

PROJECT TYPE: Deployment **LEVEL OF EFFORT:** Moderate

TECHNOLOGY COMPONENTS *(if applicable)*: CCTV System; DMS System

PREREQUISITES AND DEPENDENCIES: N/A

PERFORMANCE MEASURES: Improved Travel Time Ratio

BENEFITS: Improve incident response, congestion monitoring, and traveler information along a key corridor in the region.

OTHER CONSIDERATIONS AND ISSUES: Coordinate ITS devices with FY 2021 TSMO waitlist project application.

TI.19: District 5-0 CCTV Digital Retrofit

FOCUS AREA: Traveler Information

PRIORITY: Normal

PROJECT DESCRIPTION AND SCOPE: Retrofit 30 existing CCTV cameras to digital across District 5-0.

STAKEHOLDERS: **PennDOT 5-0**

ESTIMATED SCHEDULE: 3+ years Life Cycle: 10-15 years	**ESTIMATED COSTS:** $ (<$500k)

PROJECT TYPE: Deployment **LEVEL OF EFFORT:** Moderate

TECHNOLOGY COMPONENTS *(if applicable)*: CCTV System

PREREQUISITES AND DEPENDENCIES: N/A

PERFORMANCE MEASURES: Improved Incident Response Time

BENEFITS: Improve incident response, congestion monitoring, and traveler information along key routes in PennDOT District 5-0.

OTHER CONSIDERATIONS AND ISSUES: See District 5-0 2019 Interstate Priorities for more information and exact proposed locations.

TI.20: District 5-0 DMS Interstate Approach Gaps

FOCUS AREA: Traveler Information

PRIORITY: Normal

PROJECT DESCRIPTION AND SCOPE: Install 13 Type A DMS at the following pre-entry locations in District 5-0:

- I-78: MM 10, MM 40 (both approaches), MM 45 (both approaches)
- I-80: MM 274 (both approaches), MM 284 (both approaches), MM 302A/B (NB PA-33), MM 304 (NB PA-209), MM 305 (NB PA-209)
- I-380: MM 7 (NB PA-611)

STAKEHOLDERS: **PennDOT 5-0**

ESTIMATED SCHEDULE: 3+ years Life Cycle: 10-15 years	**ESTIMATED COSTS:** $$ ($500k-$2M)

PROJECT TYPE: Deployment **LEVEL OF EFFORT:** Moderate

TECHNOLOGY COMPONENTS *(if applicable)*: DMS System

PREREQUISITES AND DEPENDENCIES: N/A

PERFORMANCE MEASURES: Reduced Travel Time Ratio

BENEFITS: Improve traveler information on approaches to key interstate junctions in PennDOT District 5-0. Signs can be used to alert drivers about congestion, incidents, and closures on the interstate and allow them to reroute and avoid potential issues.

OTHER CONSIDERATIONS AND ISSUES: See District 5-0 2019 Interstate Priorities for more information.

TI.21: Berks ITS

FOCUS AREA: Traveler Information

PRIORITY: Normal

PROJECT DESCRIPTION AND SCOPE: Install CCTV cameras, DMS, and RWIS at key locations in Berks County:

- Retrofit I-78 VMS 5 to full-color DMS
- I-78 MM 38: RWIS
- US 222 b/w Mohns Hill Rd. and Bus. US 222: CCTV
- US 422 WB at Bus. US 422 split: CCTV and DMS
- PA-12 at River Rd. and at PA-183: CCTVs
- PA-100 near Boyertown: CCTV and DMS

STAKEHOLDERS: **PennDOT 4-0**

ESTIMATED SCHEDULE: 1-3 years Life Cycle: 10-15 years	**ESTIMATED COSTS:** $$$ ($2M-$10M)

PROJECT TYPE: Deployment **LEVEL OF EFFORT:** Moderate

TECHNOLOGY COMPONENTS *(if applicable)*: CCTV System; DMS System; RWIS System

PREREQUISITES AND DEPENDENCIES: N/A

PERFORMANCE MEASURES: Reduced Travel Time Ratio; Improved Incident Response Time; Reduced Winter Weather Crashes;

BENEFITS: Improve incident response, congestion monitoring, and traveler information at key locations in Berks County. Improve monitoring of weather and roadway conditions, particularly during winter weather. Improve plowing and winter maintenance response.

OTHER CONSIDERATIONS AND ISSUES: N/A

Appendix D. TIP Projects with ITS

TIP Highway Projects with ITS Components

Project	ITS Devices
District 4-0	
I-81 Exit 141 (@ Rt. 424)	CCTV
I-81 SB MM 232.5	Relocated, permanent DMS
I-84 Twin Bridges	Relocating CCTVs
I-81 MM 219 (@ Rt. 848)	Relocating CCTV
O&M Contract - 81 NB b/w MM 206-211	Type A DMS
O&M Contract - 80 EB	Overhead DMS retrofit
District 5-0	
22-LUI (EMCS 81743)	CCTVs and DMS
78-12M (ECMS 10466)	DMS
80-05S (ECMS 57921)	CCTV and DMS (westbound)
80-17M (ECMS 76357)	2 CCTV and 2 DMS
HOP Project I-78 exit 45 (Sheetz – EPS 198788)	CCTV
Pre-entry for Turnpike	DMS
222-22S (ECMS 92414)	DMS
District 8-0	
ITS - Lancaster Phase 4 (ECMS 106587)	CCTV & DMS
HATS TSMO ITS Devices Proj. 1 (MPMS 112709)	CCTV
HATS TSMO ITS Devices Proj. 2 (MPMS 112708)	DMS & Fiber Optic
Franklin TSMO ITS Device Proj. 2 (MPMS 112852)	DMS
Franklin TSMO ITS Device Proj. 1 (MPMS 112853)	CCTV
Lebanon TSMO ITS Device Proj. 2 (MPMS 112854)	CCTV & DMS
I-83 East Shore Section 3 (ECMS 97828)	CCTV & DMS
North York Widening #2 (MPMS 112550)	CCTV & DMS
US 222 /US 30 Interchange Improvements (ECMS 97013)	CCTV & DMS
Eisenhower Interchange (ECMS 92931, 113378, 113380, 113381)	CCTV & DMS
North York Widening #3 (Exit 21 & 22) ECMS 92924	CCTV & DMS
I-81 New Interchange (Exit 12) ECMS 93055	CCTV
I-83 East Shore Section 3B (ECMS 113357)	CCTV & DMS
North York Widening #1 (Exit 19) MPMS 112549	CCTV & DMS
US 222 Reconstruction 1 (ECMS 109618)	CCTV & DMS
US-15/US-30 Interchange (ECMS 58136)	CCTV
Blue-Gray Highway Reconstruction (ECMS 92923)	CCTV & DMS
US 222 Reconstruction 2 (MPMS 109620)	CCTV & DMS
I-83 East Shore Section 3C (ECMS 113376)	CCTV & DMS
US30/Hbg Pike Interchange (MPMS 80930)	CCTV

Appendix E. 2019 TSMO Interstate Priority List

Eastern RTMC (D8 - D4 - D5) - 2019 TSMO Interstate Priority List

District Priority	District	Category	Project Title	Approximate Cost Year 1	Approximate Cost Year 2	Approximate Cost Year 3	Approximate Cost Year 4	2020	2021	2022	2023	2024	2025 & BEYOND
1	4	Antiquated	28 CCTV retrofit (SPIF already submitted)	$ 135,000				$ 135,000					
2	4	Antiquated	1 DMS retrofit (Replace Swarco on I-80)	$ 60,000				$ 60,000					
1	5	Antiquated	I-81 Replace existing portable CMS (3 locations)	$ 540,000					$ 540,000				
1	5	Antiquated	I-80 Replace existing portable CMS (1 location)	$ 180,000				$ 180,000					
1	5	Antiquated	I-380 Replace existing portable CMS (2 locations)	$ 360,000					$ 360,000				
1	5	Antiquated	I-78 Replace existing portable CMS (4 locations)	$ 720,000					$ 720,000				
4	5	Antiquated	1 DMS Retrofit (VMS 5 to full color)	$ 80,000				$ 80,000					
5	5	Antiquated	30 CCTV retrofit to digital	$ 175,000						$ 175,000			
1	8	Antiquated	I-83 DMS Retrofit (4 locations)	$ 520,000				$ 520,000					
1	8	Antiquated	I-81 DMS Retrofit (4 locations)	$ 520,000					$ 520,000				
7	8	Communications	I-283 fiber connection	$ 410,000				$ 410,000					
3	4	Gap	6 CCTV; 6 CCTV attached to existing DMS	$ 150,000				$ 150,000					
4	4	Gap	I-80 CCTV Gap (2 locations)	$ 140,000					$ 140,000				
4	4	Gap	I-81 CCTV Gap (12 locations)	$ 420,000	$ 420,000					$ 420,000	$ 420,000		
4	4	Gap	I-84 CCTV Gap (6 locations)	$ 420,000						$ 420,000			
4	4	Gap	I-380 CCTV Gap (1 location)	$ 70,000						$ 70,000			
5	4	Gap	I-80 DMS Type A Gap (3 locations)	$ 165,000							$ 165,000		
5	4	Gap	I-81 DMS Type A Gap (7 locations)	$ 385,000							$ 385,000		
5	4	Gap	I-84 DMS Type A Gap (5 locations)	$ 275,000							$ 275,000		
6	4	Gap	I-81 DMS Structure Gap (6 locations)	$ 450,000	$ 450,000							$ 450,000	$ 450,000
6	4	Gap	I-84 DMS Structure Gap (2 locations)	$ 300,000									$ 300,000
6	4	Gap	I-380 DMS Structure Gap (1 location)	$ 150,000									$ 150,000
2	5	Gap	I-81 CCTV Gap (6 locations)	$ 250,000	$ 312,500				$ 250,000	$ 312,500			
2	5	Gap	I-78 CCTV Gap (15 locations)	$ 350,000	$ 350,000	$ 350,000	$ 356,250		$ 350,000	$ 350,000	$ 350,000	$ 356,250	
2	5	Gap	I-176 CCTV Gap (5 locations)	$ 250,000	$ 218,750				$ 250,000	$ 218,750			
2	5	Gap	I-80 CCTV Gap (4 locations)	$ 125,000	$ 250,000					$ 125,000	$ 250,000		
2	5	Gap	I-380 CCTV Gap (2 locations)	$ 187,500						$ 187,500			
3	5	Gap	I-81 DMS Gap (5 locations)	$ 300,000	$ 300,000	$ 358,333				$ 300,000	$ 300,000	$ 358,333	
3	5	Gap	I-78 DMS Gap (5 locations)	$ 300,000	$ 300,000	$ 358,333				$ 300,000	$ 300,000	$ 358,333	
3	5	Gap	I-176 DMS Gap (2 locations)	$ 383,333							$ 383,333		

Eastern RTMC (D8 - D4 - D5) - 2019 TSMO Interstate Priority List

District Priority	District	Category	Project Title	Approximate Cost Year 1	Approximate Cost Year 2	Approximate Cost Year 3	Approximate Cost Year 4	2020	2021	2022	2023	2024	2025 & BEYOND
6	5	Gap	I-78 DMS Interstate Approach Gaps- Type A (4 locations)	$ 246,154									$ 246,154
6	5	Gap	I-380 DMS Interstate Approach Gaps- Type A (1 location)	$ 61,538									$ 61,538
6	5	Gap	I-80 DMS Interstate Approach Gaps- Type A (8 locations)	$ 492,308									$ 492,308
2	8	Gap	I-81 CCTV attached to existing DMS (6 locations)	$ 125,000					$ 125,000				
2	8	Gap	I-83 CCTV attached to existing DMS (5 locations)	$ 104,167					$ 104,167				
2	8	Gap	I-283 CCTV attached to existing DMS (1 location)	$ 20,833					$ 20,833				
3	8	Gap	I-81 DMS (2 locations)	$ 236,667	$ 236,667					$ 236,667	$ 236,667		
3	8	Gap	I-83 DMS (1 location)	$ 236,667						$ 236,667			
4	8	Gap	I-81 CCTV (5 locations)		$ 875,000					$ 875,000			
4	8	Gap	I-78 CCTV (1 location)	$ 175,000						$ 175,000			
4	8	Gap	I-83 CCTV (6 locations)	$ 260,000	$ 790,000					$ 260,000	$ 790,000		
4	8	Gap	I-283 CCTV (1 location)	$ 175,000				$ 175,000					
5	8	Gap	US-30 Type A Pre-Entry (2 locations)	$ 170,000							$ 170,000		
5	8	Gap	PA-465 Type A Pre-Entry (1 location)	$ 85,000							$ 85,000		
5	8	Gap	US-11 Type A Pre-Entry (1 location)	$ 170,000							$ 170,000		
5	8	Gap	SR-238 Type A Pre-Entry (2 locations)	$ 170,000							$ 170,000		
5	8	Gap	PA-177 Type A Pre-Entry (2 locations)	$ 170,000							$ 170,000		
5	8	Gap	Union Deposit Rd. Type A Pre-Entry (2 locations)	$ 170,000							$ 170,000		
6	8	TSMO	I-83 Queue Warning	$ 18,000							$ 18,000		
8	8	TSMO	I-83 Dynamic Merge	???									